

Consumers'



Research BULLETIN

AUGUST 1949

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CONSUMERS' RESEARCH

Vol. 24 • No. 2

BULLETIN

August 1949

Off the Editor's Chest

"**W**HY don't you do more testing of foods?" writes a subscriber. In fact, several subscribers have commented that they miss the food section of the *Annual Cumulative Bulletin* (which will again be omitted, for lack of space, in the forthcoming 1949 edition). During the past two years we have done little work in this field because we came to the conclusion from a careful analysis of various sources of information that most consumers have been in the position of having to make their selections primarily on the basis of price. Since our ratings of canned food, frozen vegetables, and other items were based primarily on quality, we felt that we could use our necessarily limited personnel, facilities, and funds to better advantage by allocating all three pretty largely to tests of household appliances, such as refrigerators, vacuum cleaners, ranges, washing machines, and other items requiring fairly large initial expenditures, on which the risk of error on the part of the consumer involves a sizable sum of money, or on which he would be unable to arrive at any scientific judgment of quality, performance, or safety with his own resources.

In the field of high-fidelity radio receivers and phonographs, we have pioneered in the recognition and development of equipment for good reproduction of music, and judging from the volume of our correspondence, the subject is one of intense interest to a large number of our subscribers. This may seem to be something of a paradox at a time when

trade journals report that radio sets are a drug on the market; yet it reflects an unmistakable demand on the part of our readers. In view of the fact that we have found no inexpensive or even moderate-priced radio receivers or radio phonographs that are worthy of an *A-Recommended* rating, perhaps it is not surprising that the critical listener with a good ear for high-quality sound reproduction does not want to buy one of the commercially manufactured sets currently available. Since our selection of projects for test and exploration is shaped to a great extent by subscribers' expressed interest, we shall undoubtedly continue work in electronic devices, speakers, etc., that contribute to high quality reproduction of music from records and radio broadcasts.

To return to the question of how much testing of foods we should schedule, there are one or two points that we should like to bring to subscribers' attention. The standards of quality by which canned and frozen fruits and vegetables are graded are set by the U. S. Department of Agriculture's Production and Marketing Administration. The grades are usually Grade A, Grade B, and Grade C, based on the size, color, degree of maturity, and freedom from blemishes. The most important characteristics, quality of the flavor and nutritive values, are not measured. These grades were first developed to provide bankers and factors lending money on the current year's pack with some basis for evaluating the merchandise on which they were

(Continued on page 25)

Scientific and Technical Experts and Editors: F. J. Schlink, R. Joyce, M. C. Phillips, A. R. Greenleaf, Charles L. Bernier, and Dwight C. Aten. **Editorial Assistants:** Mary F. Roberts and B. Beam.

Symbols used to indicate sources of data and bases of ratings: A—recommended on basis of quality; AA—regarded as worthy of highest recommendation; B—intermediate with respect to quality; C—not recommended on basis of quality; cr—information from Consumers' Research's own tests or investigations; 1, 2, 3—relative prices, 1 being low, 3 high. Note that price and quality are completely differentiated in CR's listings; a quality judgment is independent of price; 48, 49—year in which test was made or information obtained or organized by the staff of Consumers' Research.

It will be advantageous if you will, whenever possible, send prompt notice of change of address at least 5 weeks before it is to take effect, accompanying your notice with statement of your old address with name in full. At least a month's notice must be given in any case. This rule, however, regarding long advance notice does not apply to military personnel.

*C.R. will, of course, gladly change addresses for men and women in the services as often as required by changes in station and other circumstances.

***For a brief cumulative index of 1949 BULLETINS preceding this issue, see page 26.

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CORRECTIONS TO CONSUMERS' RESEARCH BULLETIN OF

AUGUST 1949

Household Thermometers
p. 13

Figure 1. By error, the illustration appears upside down, so that the designation of the names of brands at the bottom of the picture is reversed. (As it appears in the Bulletin, the Airguide 404A is the one at the left.)

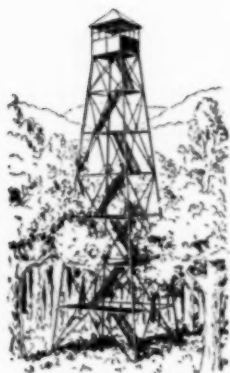
Adhesives
p. 23, col. 2

The National Archiver has advised us that their Bulletin No. 5, "The Repair and Preservation of records," mentioned in the last paragraph of the page, is no longer available; it is now out of print. The National Archives hopes to publish a revision of the Bulletin next summer; requests for copies of the Bulletin will be retained on file, to be filled in case the revision becomes available.

Oil Burner Nozzles
p. 18, col. 2

The owners of the Richfield Manufacturing Corp. (manufacturer of the Richfield Flame Control Turbulator No. 6 Oil Burner) has been changed to 41-43 Lexington St., New Rochelle, N.Y.





The Consumers' Observation Post

NYLON FABRICS for women's blouses and men's shirts have become so popular that there is a shortage of fabrics made wholly of nylon yarn, reports the New York Times. Although labeling regulations of the Federal Trade Commission require designation on the label of a garment of the percentage of silk and rayon used in a fabric, an increasing number of violations have been observed. Fabrics sold as all-nylon, for example, have been found to be largely made of rayon yarns with only a small percentage of nylon. One of the important claims for the superiority of nylon fabric is that it may be washed and worn without ironing, but obviously this would not be true of a fabric containing a large percentage of rayon. If the situation is not cleared up promptly, consumers' disappointment may ruin the market for the all-nylon product.

HOUSEHOLD APPLIANCES are so plentiful that the discount houses where "you can get it wholesale" are again making their appearance. Toasters, typewriters, jewelry, radio, and even television sets are to be had at 20 percent off list price, according to an extensive survey of the situation in The Wall Street Journal. It appears that "discount" cards are customarily distributed to employees of large corporations, through credit unions, to state employees, and through labor unions. In some cases, identification cards are not called for where the customer doesn't look like the kind "who would make trouble." Competition from the discount houses has prodded regular dealers into making price reductions or "name brand" merchandise, and trade-in allowances now are often so generous as to cut the price of an appliance to 20 percent or more below list. With appliances that may require good and responsible servicing, however, it will often be wise for the consumer to buy only from a well-established retailer.

FOOD THAT IS RAISED ON FERTILE SOIL has higher nutritive quality than produce and animals grown on soil of lower mineral fertility. In a speech last spring, Glen W. Bunting, of the Central Farmers Fertilizer Company, Chicago, pointed out that, in driving through the northern counties of Florida, he was impressed with the sight of starving cattle walking in lush-appearing vegetation, which was obviously lacking in certain necessary minerals. He drew the conclusion that malnutrition was not confined to Greece, China, or India, for here in the United States people living in certain rural areas who raised most of their own food were affected by the mineral deficiencies of the soil. In certain areas of Wisconsin, it has been found necessary, according to Mr. Bunting, to add small amounts of cobalt, iodine, manganese, and copper to the diet of sheep in order to control losses by death in flocks, and he raised the question whether it is not reasonable to assume that human beings are affected by the same mineral deficiencies. Curiously enough in the semi-arid West where the vegetation is sparse, the cattle are in good flesh, have a healthy coat of hair, and otherwise reflect the results of a good diet.

SELF-SERVICE, READY-PACKAGED MEATS are not too popular with consumers, at least in Philadelphia, according to James Cooke, general manager of the Penn Fruit Co., Philadelphia. In a speech to members of the Super Market Institute, Mr. Cooke presented the findings of a survey which showed that consumers complained chiefly about the lack of freshness and the waste in self-service meats. They also found fault with the size, types, and thickness of the cuts; 64 percent of those queried objected to buying already-ground meat in packages. Thrifty housewives apparently are conscious of being sold too much fat at meat prices.

THE TYPICAL RADIO PROGRAM currently available has been characterized as "something that makes a noise in people's homes," by the magazine FM and Television, which takes a dim view of the entertainment value of the yells and screams of the give-away programs, of bands that play mostly on the listener's nerves, and announcers who endlessly repeat unconvincing claims. The journal suggests that there is a large and unfilled demand for programs that cheer, soothe, and divert listeners from their own troubles, and that the present suspense and tension of radio programs may explain in part the switch to phonograph records.

* * *

"FLAVOR ENHANCER" is the term now used to describe the chemical monosodium-glutamate that is to be found in nearly all canned soups and some canned meat products. It is added to bring out a meaty flavor and has heretofore been considered as an artificial flavoring by the Food and Drug Administration. Manufacturers' representatives in the past year have overwhelmed the Food and Drug Administration with evidence and arguments to show that the chemical is not a flavor, but acts to enhance the natural flavor of the foods with which it is used. In other words, a few bits of meat in canned soup can be made to seem like a lot more, but, admonish Food and Drug men, the product must not be used to make any product appear better than it is or conceal inferiority or damage. What, may we ask, is making a little meat taste like a lot more, but making a product appear better than it really is?

* * *

"INFRA-RED" HEAT LAMPS, that are now widely used as a source of warmth for relief of muscular aches and pains, are poorly labeled or grossly mislabeled, in the opinion of the Council on Physical Medicine of the American Medical Association. The heat supplied by such devices does not penetrate to the site of the involvement and cannot be accurately described as "penetrating" and "deep." The effective means of deep heating is supplied by diathermy, points out the Council, and the term "deep therapy" is used in conjunction with roentgen radiation or X-ray. The Council advocates full and adequate labeling for all heat lamps, including adequate directions and precautions such as: the minimum safe distance at which the lamp should be placed to provide comfortable warmth; and warning against its unattended use by children, debilitated persons, or application to anesthetic (numbed) skin areas or in the presence of poor circulation.

* * *

FEEDING WEEDS TO RABBITS in order to convert waste feedstuffs to valuable human food, as urged by the British government, has not been found to be an economic practice. It appears that the weed-gatherer used up 1022 calories to feed an animal that supplied his keeper with only 549 calories. To maintain a rabbit on weeds would have required 23 hours' work a day. Just another of many examples of the futility of government planning without checking on the practical application of some desk bureaucrat's theory.

* * *

THE DAY OF PRICE RISES in household appliances is over, according to one of the outstanding trade journals, and it will require intensive selling to dispose of present stocks in warehouses. In the meantime, many factories are running on a four-day week to hold down production of items that are not moving into consumers' hands. The American Institute for Economic Research advises that as soon as deflation has reduced the prices of durable consumers' goods that last from five to fifteen years, such as automobiles, washing machines, stoves, and refrigerators, it will be advisable to replace out-of-date or old models with new appliances.

* * *

CONSUMERS INTERESTED in adequate enforcement of the present Food, Drug, and Cosmetic Act should be on the lookout for news of amendments, specifically amendments that would weaken the protection the Act now affords. An amendment, known as the "Moore" amendment, has recently been proposed that would require proof of wilful intent or gross negligence before a criminal conviction for violation of the Federal Food, Drug, and Cosmetic Act could be obtained. "Intent" is extremely difficult of legal proof. Indeed, one of the weaknesses of the old Food and Drugs Act, that was remedied by the present law, was the provision of the Sherley Amendment of 1912 which required proof of fraud or wilful

(The continuation of this section is on page 29)

AUTOMOBILES FOR 1949

Overdrive

Advantages and Disadvantages

THE term "overdrive" as now used, applies to an assembly of gears in a casing attached to the rear end of a conventional automobile transmission. The assembly provides an additional gear ratio, which permits the engine to operate at a lower speed, for a given forward speed of the car, than is ordinarily available with the high gear of the conventional transmission. (In effect the overdrive provides two additional gear ratios, an overdrive high, and an overdrive second, which may be utilized for intermittent or occasional use, at the will of the driver.)

Overdrive units are currently available either as regular or optional equipment on *Ford, Mercury, Lincoln, Studebaker, Hudson, Packard, Nash, Willys-Overland, Frazer, and Kaiser* cars. The units may be made to function semi-automatically, or may be "locked out" of action by means of a control on the dash. When the control is in the operating position, the gears of the conventional transmission are shifted as usual, the overdrive becoming engaged at some predetermined car speed (usually about 25 to 30 miles per hour, or somewhat higher), upon lifting the foot momentarily from the accelerator pedal. So long as the throttle pedal is not fully depressed, the unit remains in action up to maximum car speed. However, the unit may be disengaged at any time by pushing the accelerator pedal all the way down, beyond full open speed, so that a "kick-down" switch is engaged. The gear ratio then becomes the usual third or high gear of the conventional transmission, providing the acceleration and high hill-climbing ability normally available in this gear. The overdrive re-engages when the kick-down switch is again opened by raising the foot slightly from the accelerator pedal, provided the car speed is above the cut-in speed already mentioned. When the car is slowed down, as for a stop, or to make a turn, the overdrive unit again becomes disengaged at some pre-

determined car speed (usually somewhat slower than when engaged at increasing car speed), so that fourth speed or overdrive is not effective when the car is running slowly or is re-started after slowing down or stopping. The unit can always be disengaged, and third speed or normal high gear re-engaged, by depressing the accelerator pedal to engage the kick-down switch, regardless of car speed.

In current (1949) cars the overdrive unit provides a ratio approximately seven-tenths (0.7) that of the ratio in conventional high gear. For instance, if the engine speed at 60 m.p.h. normally is 3000 rpm., in overdrive the engine speed is 2100 rpm. Although the engine speed is decreased by 30 percent, the fuel consumption is not decreased by the same amount; the decrease in fuel consumption is usually not more than 15 percent.¹

In many cases a different rear axle ratio is used in cars equipped with overdrive. Ford, for example, uses a standard 3.73 to 1 ratio in cars not equipped with overdrive. Cars with overdrive have a rear axle ratio of 4.1 to 1, giving an engine to rear wheel ratio, with overdrive engaged, of $4.1 \times 7/10$ or 2.87 to 1.

For those who do not feel that manual gearshifting is too much of a task, and hence do not feel the need for an automatic transmission and who do enough road driving to make the decrease in fuel consumption worth while, the overdrive unit is recommended. The additional cost of the unit (if extra equipment) will then be justified in some fuel savings, considerably decreased wear of the engine, and there will be much smoother and quieter engine operation at normal speeds. With the overdrive, faster road speeds may be maintained with less "wear and tear" on both driver and car. In those areas where distances are great and driving speeds are often above 50 m.p.h., or where sustained high road speeds are permissible, the overdrive unit is a distinct advantage; its greatest advantage is in country which is relatively flat, or only moderately hilly and where a good deal of open-road driving is to be done.



Lincoln Sport Sedan

¹Note: The reason the decrease in fuel consumption is not proportional to the decrease in engine speed is because at any given car speed the amount of power required to drive the car is the same, regardless of the engine speed. (This refers to the power required to overcome wind resistance, tire friction, and friction of moving parts, excluding the engine.) Thus there would be no decrease in fuel consumption in so far as the car itself is concerned. The fuel saving which does occur is because a slower running engine runs at a higher "load-factor." This means that while the same amount of engine power is required to drive the car, this power may be produced with the throttle farther closed if the engine runs fast, or with the throttle farther open if it runs more slowly. Under the latter condition the load on the engine is a greater proportion of its maximum output (hence the term "load-factor").

As the efficiency of an engine (ratio of power output to heat energy input in the fuel supplied) is a maximum at full throttle opening, the fuel required per unit of power delivered is less with the engine running slower, i.e., with the overdrive engaged.

The overdrive unit should not be purchased, or should be "locked out" of action, if practically all driving is to be in town or city, and road speeds due to congestion or desire are relatively slow, a good deal of the time. Since the car when the overdrive is in action (dash control pushed in) is also freewheeling, the braking effect of the engine is not available. Use of an overdrive makes the brakes do more work, and brake shoe wear is therefore necessarily increased; the increase should be small if the car can be permitted to coast, a good deal, in slowing down as it can in much open-road driving. The extra brake wear will be relatively large if a good deal of the driving is done in hilly or mountainous country, and the overdrive unit is not locked out in descending long slopes, so as to use the engine for part of the braking. Whether or not state laws require the use of the engine as a brake (no "coasting out of gear") when descending hills, the overdrive unit should always be locked out of action under these conditions; the locking out is best done by bringing the car almost to a stop at the beginning of the hill and then pulling out the overdrive control, or the control may be pulled out just after the driver pushes the accelerator pedal all the way down, or at any time the car is running in conventional third speed — not in overdrive. (The transmission drops back into conventional third speed whenever the speed drops to about 21-27 m.p.h.) It should be borne in mind that when the overdrive is operative (control *in*) the car is not as safe as in normal driving. Dangers arise particularly on hills, in city traffic, under bad or slippery road conditions, or in crossing railroad tracks or other hazardous areas.

Especially on hills, the driver of a car with overdrive must remember that his previous habits and customs in braking will not serve; since the car is freewheeling and the engine not being driven by the motion of the car, the car may go a great deal faster on the same grade, and this fact must be compensated for by a much stronger and earlier use of the brake, which, of course, means that sure and unfailing action of the brake is a much more critical problem than with a car not having overdrive. One fatal accident near Consumers' Research is believed to have been due to a driver's not making an allow-



Willys Jeep Station Wagon

ance for the changed situation in driving a new car in overdrive, so that he went off the road because of excessive speed at a turn. The car in normal third gear and without overdrive, would have been moving at a considerably slower speed; this could in many cases mean the difference between safe movement around the curve and a serious or fatal accident.

Mechanically, an overdrive unit is far more simple and reliable, and serviced with greater certainty, than any semi-automatic or fully-automatic transmission. With the overdrive, there is little chance that the car cannot be driven to a service station for repair of the overdrive unit, should it develop trouble, or fail to function properly. The experience so far with the overdrive mechanism has been very favorable, from the standpoint of reliability and minimum need for attention and repairs.

Additional Listings of 1949 Cars

A—

Cadillac 61. \$2894 f.o.b.; \$3029 delivered N.Y.C. *Hypodramatic* drive standard equipment. Engine: 8 cylinder, valve-in-head, 3-13/16 in. bore x 3 3/4 in. stroke; 331 cu. in. displacement; 160 hp. at 3800 rpm.; taxable hp., 46.5; compression ratio, 7.5 to 1. Engine oil capacity, 5 qt.; cooling water, 18 qt.; gas tank, 20 gal. Gear ratio, 3.77 to 1 (3.36 to 1 optional). Battery, 17-plate, 115-amp.-hr. (adequate). Wheelbase, 126 in.; over-all length, 215 1/2 in.; width, 80 in.; height, 63 1/2 in. Tire size, 8.20 x 15 (adequate). Brake area, 208 sq. in.; brake factor, 44 (exceptionally good). Road clearance: 8 in. at front; 7 1/2 in. at rear. Foamed rubber cushions standard equipment. Seat widths: front, 63 1/2 in.; rear, 52 in. Headroom: front, 36 3/4 in.; rear, 35 in. (insufficient). Performance factor, 33.8 (highest of this year's cars). Reported gasoline mileage: in city driving, 10 to 12 m.p.g.; in country driving, 12 to 14 m.p.g. Strong "X" frame with cross members. Vulnerable to costly side damage. Accessibility of spare tire, good. Shipping weight, 3990 lb.

Cadillac 75. \$4791 f.o.b.; \$4933 delivered N.Y.C. *Hypodramatic* drive standard equipment. Engine: Same as used in Cadillac 61. Wheelbase, 136 in.; over-all length, 226 in.; width, 82 in.; height, 68 1/2 in. Tire size, 7.50 x 16, 6 ply (adequate). Brake area, 233 sq.



Cadillac 60

in.; brake factor, 43.8. Performance factor, 30. Reported gasoline mileage: city driving, 10 to 12 m.p.g.; in country driving, 12 to 14 m.p.g. Accessibility of spare tire, excellent. Shipping weight, 4581 lb.

Lincoln 121. \$2575 f.o.b.; \$2708 delivered N.Y.C. Hydramatic drive extra. Engine: 8 cylinder, V type, $3\frac{1}{2}$ in. bore x $4\frac{3}{4}$ in. stroke; 336.7 cu. in. displacement; 152 hp. at 3600 rpm.; taxable hp., 39.2; compression ratio, 7.0 to 1. Engine oil capacity, 6 qt.; cooling water, $3\frac{1}{2}$ qt.; gas tank, 19 $\frac{1}{2}$ gal. Gear ratio, 3.91 to 1 (3.07 with overdrive). Battery, 17-plate, 120-amp.-hr. (adequate). Wheelbase, 121 in.; over-all length, 213 in.; width, 77 in.; height, 63.5 in. Tire size, 8.20 x 15 (adequate). Brake area, 220 sq. in.; brake factor, 45.8, exceptionally good. Hand brake subject to freezing. Road clearance: 8 $\frac{1}{4}$ in. at front; 8 in. at rear. Seat widths: front, 59 in.; rear, 61 in. Headroom: front and rear, 36 in. Performance factor, 31.6. Reported gasoline mileage: city driving, 13 to 15 m.p.g.; in country driving, 14 to 17 m.p.g. Strong "X" frame with reinforcement members of standard construction. Vision over hood, good, but vision through rear window poor in inclement weather. Vulnerable to costly side damage. Rear doors hinged at rear (undesirable). Rear wheels and tires readily accessible for servicing. Accessibility of spare tire, good. This car uses same body as Mercury. Shipping weight, 4060 lb.

Lincoln Cosmopolitan. \$3243 f.o.b.; \$3437 delivered N.Y.C. Hydramatic drive extra. This is a larger model of the Lincoln 121 using the same engine but a different body. Wheelbase, 125 in.; over-all length, 220 in.; gas tank capacity, 21 $\frac{1}{2}$ gal. Shipping weight, 4315 lb.

B+

Willys Station Wagon 4. \$1595 f.o.b.; \$1794 delivered N.Y.C., including overdrive. Engine: 4 cylinder, L head, $3\frac{1}{2}$ in. bore x $4\frac{3}{4}$ in. stroke; 134.2 cu. in. displacement; 63 hp. at 4000 rpm.; taxable hp., 15.6; compression ratio, 6.48 to 1 (7.0 to 1 optional). Engine oil capacity, 4 qt.; cooling water, 11 qt.; gas tank, 15 gal. Gear ratio, 5.38 to 1 (4.68 to 1 with overdrive). Wheelbase, 104 in.; over-all length, 174 $\frac{3}{4}$ in.; width, 68 $\frac{3}{4}$ in.; height, 72 $\frac{1}{2}$ in. Tire size, 6.00 x 15 (adequate). Brake area, 133 sq. in.; brake factor, 38. Road clearance: 10 in. at front; 8 $\frac{1}{2}$ in. at rear (unusually good). Seat widths: front, 47 in.; rear, 41 $\frac{1}{2}$ in. Headroom: 41 $\frac{1}{2}$ in. at front; 38 $\frac{1}{2}$ in. at rear. Performance factor, 18 (about 70% of Ford 8). Reported gasoline mileage: city driving, 23 to 25 m.p.g.; in country driving, 26 to 28 m.p.g. Rear seats can be unbolted and removed to provide 98 cu. ft. of cargo-carrying space. Shipping weight, 2760 lb.

B-

Crosley 2-Door Sedan. \$971 f.o.b.; \$1029 delivered N.Y.C. Engine: 4 cylinder, valve-in-head, $2\frac{1}{2}$ in. bore x $2\frac{1}{4}$ in. stroke; 44 cu. in. displacement; 26.5 hp. at 5400 rpm.; taxable hp., 10; compression ratio, 7.8 to 1. Engine oil capacity, 2 qt.; cooling water, 4 qt.; gas tank, 6.5 gal. Gear ratio, 5.17 to 1. Wheelbase, 80 in.; over-all length, 148 $\frac{1}{4}$ in.; width, 49 in.; height, 57 in. Tire size, 4.50 x 12 (adequate). Brake area, 65 sq. in.; brake factor, 35.8. Road clearance: 8 $\frac{1}{2}$ in. at front; 6 $\frac{1}{4}$ in. at rear (grossly insufficient). Seat widths: front, 42 in.; rear, 30 in. Headroom: 34 $\frac{1}{4}$ in. at front; 32 $\frac{1}{2}$ in. at rear. Performance factor, 14.6 (about 55% of that for Ford 8). Reported gasoline mileage: city driving, 30 to 40 m.p.g.; in country

driving, 40 to 50 m.p.g. Body light and "tinny." Vision over hood, fair. Accessibility of spare tire, good. Trunk space, small. High speed engine considered not likely to give a long life. Shipping weight, 1363 lb.

Willys Station Wagon 6. \$1695 f.o.b.; \$1900 delivered N.Y.C. Engine: 6 cylinder, L head, 3 in. bore x $3\frac{1}{2}$ in. stroke; 148.4 cu. in. displacement; 72 hp. at 4000 rpm.; taxable hp., 21.6; compression ratio, 6.42 to 1. Engine oil capacity, 5 qt.; cooling water, 10 $\frac{1}{4}$ qt.; gas tank, 15 gal. Performance factor, 20. Reported gasoline mileage: in city driving, 22 to 24 m.p.g.; in country driving, 24 to 26 m.p.g. Except for engine, this car is essentially the same as the Willys 4. Shipping weight, 2860 lb.

Identification

In the table of listings, the *Brake Factor* is a number indicative of the probable relative life of the brake linings; this is important from the standpoint of safety of the car and cost of maintenance. The figures are obtained by dividing the total area of the brake linings in square inches by the shipping weight of the car plus 750 lb. (450 lb. for the Crosley, 600 lb. for Willys station wagons) and multiplying by 1000 (to avoid fractional numbers). *Engine Revolutions per Mile* gives a rough measure of the probable or expected rate of engine wear. Piston displacement in thousands of cubic inches per mile is a number that gives an approximate measure of economy in use of gasoline and oil. *Performance Factor* is a measure of the relative ability of the car to respond quickly and powerfully when the accelerator pedal is depressed. This figure is obtained by dividing the maximum horsepower of the car by its curb weight plus 750 lb. (which represents the average added load in cars of normal size, for five passengers), 450 lb. (for the Crosley), or 600 lb. (for Willys station wagons) and multiplying the result by 1000 (to avoid fractional numbers). The larger the number, the higher the relative "performance." It should be noted that this method of judging a car assumes that the gear ratio and tire size have been adjusted by the manufacturer's engineers so that maximum car speed occurs at an engine speed just a little above that at which maximum horsepower is developed.

This report is not based on exhaustive tests (which could not in any case have been carried out in time for the information to be useful to our subscribers), but on the opinions of several well-qualified engineers, supplemented by a careful study of specifications, and reports of performance in the field.

Automatic Transmissions

A report on automatic transmissions, including the new Packard Ultramatic, will appear in a forthcoming issue.

	F.O.B. Price \$	N.Y.C. Delivered Price, \$	Wheelbase, Inches	Over-all Length, Inches	Over-all Width, Inches	Horsepower at Rated Revolutions per Minute	Shipping Weight, lb.	Com- pression Ratio		Brake Area, sq. in.	Brake Factor	Tire Size
								Standard	Optional			
Price Group 1												
Crosley	971	1029	80	148½	49	26.5 @ 5400	1363	7.8	—	65	36	4.50 x 12
Willys Jeep	—	1470	80	123	59	63 @ 4000	2037	6.48	7.0	—	—	6.00 x 16
Chevrolet Styleline	1471	1561	115	197	74	90 @ 3300	3075	6.6	—	161	41	6.70 x 15
Chevrolet Fleetline	1471	1561	115	197	74	90 @ 3300	3085	6.6	—	161	41	6.70 x 15
Ford 6	1368	1566	114	197	72	95 @ 3300	2992	6.8	—	176	47	6.00 x 16
Ford 8	1546	1640	114	197	72	100 @ 3600	3032	6.8	—	176	47	6.00 x 16
Plymouth P-18		1676	118½	192	71½	97 @ 3600	3060	7.0	—	158	40	6.70 x 15
Willys Jeepster	—	1690	104	177½	—	63 @ 4000	2468	6.48	7.0	—	—	5.90 x 15
Studebaker Champion	1689	1759	112	192	69½	80 @ 4000	2745	6.5	7.0	148	42	6.40 x 15
Willys 4 Station Wagon	1595	1794	104	175	68¾	63 @ 4000	2760	6.48	7.0	133	38	6.00 x 15
Price Group 2												
Pontiac Streamliner 6	1771	1833	120	203	74	90 @ 3400	3330	6.5	7.5	171	42	7.10 x 15
Pontiac Chieftain 6	1792	1854	120	203	74	90 @ 3400	3330	6.5	7.5	171	42	7.10 x 15
Willys 6 Station Wagon	1695	1900	104	175	68¾	72 @ 4000	2860	6.42	—	133	—	6.70 x 15
Pontiac Streamliner 8	1839	1902	120	203	74	104 @ 3800	3360	6.5	7.5	171	42	7.10 x 15
Pontiac Chieftain 8	1860	1922	120	203	74	104 @ 3800	3360	6.5	7.5	171	42	7.10 x 15
Nash Super 600	1832	1956	112	201	77½	82 @ 3800	2905	7.0	—	132	36	6.40 x 15
Dodge Meadowbrook		1983	123½	204	73	103 @ 3600	3420	7.0	—	—	—	7.10 x 15
Dodge Coronet		2062	123½	204	73	103 @ 3600	3420	7.0	—	—	—	7.10 x 15
Kaiser Special	1995	2066	123½	206½	73	100 @ 3600	3271	7.3	—	176	44	7.10 x 15

Note: f.o.b. prices of Plymouth, Dodge, Chrysler and De Soto cars are not shown, as the published prices do not include delivery charges and hence are not comparable with the f.o.b. prices of other makes.

	Tire Data		Seat Widths, Inches		Minimum Road Clearance, in.	Accessibility of Spare Tire	Engine to Rear Wheel Ratio		Engine Revolutions per Mile		Piston Disp. in Thousands cu. in./mi.		Performance Factor	Rating	REMARKS
	Calculated Actual Load per Tire, lb.	% Overload					Standard	Optional or Overdrive	Standard	In Over-drive	Standard	In Over-drive			
			Front	Rear											
	455	None	42	30	6¼	Good	5.17	—	4963	—	218	—	14.6	B -	
	660	None	—	—	8½	Very Good	5.38	—	3870	—	520	—	25.4	A	A good car for severe or rough-country field service. Considered overpriced.
	955	3.8	60	58½	7½	Good	4.11	—	2918	—	632	—	23.5	B	Windshield posts and door posts structurally weak.
	960	4.3	60	58½	7½	Good	4.11	—	2918	—	632	—	23.5	B -	Same car as <i>Stydline</i> but has streamlined body with poor rear vision and reduced headroom at rear.
	935	2.2	56	60	7½	Good	3.73	2.87	2686	2066	607	467	25.4	A -	Considered to be less rugged than earlier <i>Ford</i> models.
	945	3.3	56	60	7½	Good	3.73	2.87	2686	2066	643	495	26.4	A -	Considered to be less rugged than earlier <i>Ford</i> models.
	950	3.3	56	57	7	Very Good	3.9	—	2769	—	603	—	25.4	A -	
	765	2.7			8¼	Very Good	4.88	—	3680	—	494	—	20.5	B +	Aims for Collegiate appeal in a small car. Considered overpriced.
	875	6.1	59¼	58¼	7¾	Very Good	4.1	3.19	2972	2313	505	393	22.9	B +	
	880	1.1	47	41½	8½	Good	5.38	4.68	4019	3496	539	469	18.0	B +	Good utility car for light use. Better than usual road clearance.
	1020	3.0	60	58½	7½	Good	4.1	3.63	2833	2508	676	600	22.0	B +	<i>Hydraulic Drive</i> \$190 extra on all <i>Forlane</i> models. Poor rear vision and reduced headroom at rear.
	1020	3.0	60	58½	7½	Good	4.1	3.63	2833	2508	676	600	22.0	A -	Same car as <i>Streamliner 6</i> , but has preferred type of body.
	900	None	47	41½	8½	Good	5.38	4.68	3830	3331	568	494	20.0	B -	Same as 4-cylinder <i>Willys</i> except for new 6-cyl. engine.
	1030	4.0	60	58½	7½	Good	4.1	3.63	2833	2508	705	625	25.3	B +	Uses same body as <i>Streamliner 6</i> .
	1030	4.0	60	58½	7½	Good	4.1	3.63	2833	2508	705	625	25.3	A -	Same engine as <i>Streamliner 6</i> , but has preferred type of body.
	915	10.9	60½	52	7¼	Good	4.4	3.41	3190	2472	551	427	22.5	B +	Fair performance, good fuel economy.
	1040	5.1	58	58	7¼	Very Good	4.1	—	2833	—	652	—	24.7	B +	<i>Fluid Drive</i> (fluid coupling) standard equipment.
	1040	5.1	58	58	7¼	Very Good	4.1	3.9	—	2695	—	620	24.7	B +	A deluxe model of <i>Meadowbrook Gyro-Matic</i> transmission \$95 extra. ¹
	1005	1.5	62	62½	7	Very Poor	4.09	—	2826	—	638	—	25.6	B +	

¹A semi-automatic transmission used in conjunction with fluid coupling.

	F.O.B. Price \$	N.Y.C. Delivered Price, \$	Wheelbase, Inches	Over-all Length, Inches	Over-all Width, Inches	Horsepower at Rated Revolutions per Minute	Shipping Weight, lb.	Com- pression Ratio		Brake Area, sq. in.	Brake Factor	Tire Size	
								Standard	Optional				
Price Group 3	Studebaker Commander Deluxe	2019	2102	119	205½	69½	100 @ 3400	3240	6.5	7.0	178	45	6.50 x 15
	Oldsmobile 6-76	1848	2134	119½	202	75¼	105 @ 3400	3355	6.5	—	160	39	7.10 x 15
	Kaiser Deluxe	2195	2278	123½	206½	73	112 @ 3600	3296	7.3	—	176	44	7.10 x 15
	Hudson Super 6	2222	2296	124	207½	77	121 @ 4000	3555	6.5	7.0	158	37	7.10 x 15
	Packard 8	—	2332	120	205	77½	135 @ 3600	3850	7.0	—	—	—	7.60 x 15
	Nash Ambassador Super	2279	2360	121	210	77½	112 @ 3400	3320	7.0	7.5	176	43	7.10 x 15
	Chrysler Royal 6-45	—	2392	125½	206½	73½	116 @ 3600	3571	7.0	—	173½	40	7.60 x 15
	Oldsmobile 8-88	2265	2400	119½	202	75¼	135 @ 3600	3610	7.25	—	160	37	7.60 x 15
Price Group 4	Studebaker Land Cruiser	2328	2412	123	209½	—	100 @ 3400	3325	6.5	7.0	178	44	6.50 x 15
	De Soto Deluxe	—	2430	125½	207	72	112 @ 3600	3700	7.0	—	173½	39	7.60 x 15
	Buick 51 Super	2174	2482	121	209½	78	115 @ 3600	3835	6.6	6.9	161½	35	7.60 x 15
	Mercury	2054	2550	118	207	77	110 @ 3600	3600	6.8	—	179	41	7.10 x 15
	Frazer Standard	2395	2563	123½	208	73	112 @ 3600	3332	7.3	—	176	43	7.10 x 15
	Hudson Super 8	2343	2590	124	208	77	128 @ 4200	3565	6.5	7.0	158	37	7.10 x 15
	Oldsmobile 8-98	2521	2600	125	213	78¾	135 @ 3600	3925	7.25	—	192	41	7.60 x 15
Price Group 5	Lincoln 121	2575	2708	121	213	77	152 @ 3600	4060	7.0	—	220	46	8.20 x 15
	Packard 8 Super	—	2716	127	212½	77½	150 @ 3600	3970	7.0	—	—	—	7.60 x 15
	Chrysler Saratoga	—	2811	131½	212½	74¾	135 @ 3400	4121	7.25	—	189	39	8.20 x 15
	Cadillac 61	2894	3029	126	215½	80	160 @ 3800	3990	7.5	—	208	44	8.20 x 15
	Buick 71 Roadmaster	2758	3088	125¾	214	78	150 @ 3600	4205	6.9	—	208	42	8.20 x 15
	Lincoln Cosmopolitan	3243	3437	125	220	79	152 @ 3600	4315	7.0	—	220	43	8.20 x 15
	Packard 8 Custom	—	3840	127	213½	77½	160 @ 3600	4270	7.0	—	208	42	8.20 x 15
	Cadillac 75	4791	4933	136	226	82	160 @ 3800	4581	7.5	—	233	44	7.50 x 16

	Tire Data		Seat Widths, Inches		Minimum Road Clearance, in.	Accessibility of Spare Tire	Engine to Rear Wheel Ratio		Engine Revolutions per Mile		Piston Disp. in Thousands cu. in./mi.		Performance Factor	Rating	REMARKS
	Calculated Actual Load per Tire, lb.	% Overload	Front	Rear			Standard	Optional or Overdrive	Standard	In Over-drive	Standard	In Over-drive			
	1000	None	59¼	58¾	6¾	Very Good	4.09	3.18	2945	2290	723	561	25.0	B+	<i>Hydramatic</i> drive \$195 extra. Engine same as <i>Kaiser Special</i> , but hp. increased. Essentially a good car, but relatively overpriced.
	1025	3.5	60	58½	8	Good	4.1	3.63	2833	2508	728	645	25.6	B+	
	1010	2.0	62	62½	7	Very Poor	4.09	2.99	2826	2066	638	467	27.7	B+	
	1075	8.6	62	63	6½	Poor	4.1	3.19	2833	2204	742	577	28.1	B+	
	1150	5.5	57½	50½	7½	—	3.9	2.96	2605	1977	750	569	29.4	A-	
	1020	3.0	60½	52	7½	Good	4.1	3.1	2833	2142	665	503	27.5	B+	
	1080	None	58	58	7¾	Good	3.9	3.73	2605	2492	654	625	26.8	A-	
	1090	None	60	58½	8	Good	—	3.23	—	2158	—	656	31.0	B+	
	1020	1.4	59¼	58¼	6¾	Very Good	4.09	3.18	2945	2290	723	561	24.5	B+	Is rated B- with <i>Dynaflow</i> transmission, which is \$212 extra. High output engine, good performance. <i>Hydramatic</i> drive standard equipment.
	1110	2.0	58	58	7¾	Good	3.9	3.73	2605	2492	616	590	25.2	A-	
	1145	5.0	64	52	8	Good	4.45	—	2973	—	738	—	25.1	B+	
	1090	10.1	59	50	7¼	Good	3.91	2.99	2702	2066	691	528	25.3	A-	
	1020	3.0	62	62½	7	Very Poor	4.09	2.99	2826	2066	638	467	27.4	B+	
	1080	9.1	64	64	7	Poor	4.1	3.19	2833	2204	719	560	29.6	B+	
	1170	7.3	64	52	8½	Good	—	3.23	—	2158	—	655	28.9	A-	
	1200	None	59	61	8	Good	3.91	3.07	2510	1971	845	664	31.6	A-	<i>Hydramatic</i> drive optional at extra cost. High performance factor. High performance factor. <i>Prestomatic</i> transmission ¹ standard equipment. Considered fastest and most powerful 1949 car (top performance factor). <i>Dynaflow</i> is standard equipment. <i>Hydramatic</i> drive standard equipment. <i>Ultramatic</i> drive is standard equipment. Similar to <i>Dynaflow</i> , with added features. High performance factor. Uses 6-ply tires. <i>Hydramatic</i> drive is standard equipment.
	1180	8.3	57½	50½	7½	—	3.9	2.96	2605	1977	854	647	31.8	A	
	1220	None	58	58	7¾	Good	—	3.54	—	2273	—	735	27.7	A-	
	1185	None	63½	52	7½	—	3.77	3.36	2420	2157	801	714	33.8	A-	
	1240	1.2	64	52	8	Good	—	3.9	—	2504	—	803	30.3	B+	
	1265	3.3	60	61	8	—	3.91	3.07	2510	1971	846	664	30.0	A-	
	1255	2.4	57½	50½	8	Very Poor	—	3.54	—	2273	—	809	31.9	B+	
	1335	None	60½	50¼	8¾	Very Good	4.27	3.77	2776	2450	919	811	30.0	A-	

Household Thermometers



DON'T be surprised if your neighbor comes over to your house on a hot day and tells you about the extreme temperature reading at his house, and then when you look at your own thermometer you find a different and much lower temperature reading. Chances are that both thermometers are wrong, perhaps by a considerable amount. Of course, it is quite possible that your neighbor was reporting a temperature read in the sun. In that case, the reading would have practically no meaning upon which different people could agree; a reading in the sun does not measure the temperature of the air around the thermometer bulb — which is what a weather thermometer is designed to

measure — but depends upon many other factors, including the temperature reached by sun-heated objects near the thermometer, and the reflection characteristics of the thermometer bulb itself and of nearby objects. The only temperature that has a definite meaning, and on which a reliable reading can be taken, is that of the air, in the shade; unfortunately it is possible to make a considerable error in measuring that, even when the thermometer itself is intrinsically of good accuracy.

The sensitivity and accuracy required of a thermometer vary to a considerable extent with the purpose for which it is to be used. The amateur meteorologist, for example, requires a high degree of accuracy; if he is really fussy, he may use a thermometer supplied with a calibration chart showing the deviations of the readings from true temperatures as measured by a precise or standard thermometer. A "standard" thermometer is not a term that should be used carelessly, as it is in much advertising.

Standard thermometers are always accompanied with a certificate which shows the corrections at different temperature readings, so that true readings of temperature can be arrived at (by adding the correction to the reading, at any given temperature).

The average person wants an outside thermometer to let him know how warmly he should dress when he goes out, what care needs to be taken of plants, trees, and animals; he needs a thermometer indoors to indicate when it is time to start the heating plant or how well his furnace thermostat is regulating the temperature. For such ordinary household purposes no great accuracy is required, although it is well to bear in mind that even a small error in the reading of a thermometer may cost money, since it may result in keeping the average temperature in the house higher than necessary or desirable by a degree or two, and that excess of temperature spread over the whole winter period can be equivalent to a substantial amount of coal, oil, or other fuel. Ordinarily with an indoor or outdoor thermometer, a maximum difference of plus or minus (\pm) 1°F is easily permissible, and even a maximum 2° thermometer error could be tolerated in most homes. Accuracy within these limits was found in some thermometers sold in five-and-ten-cent stores before the war, but present-day thermometers seem to be made and adjusted with less care than formerly.

Anyone who has observed a display of ther-

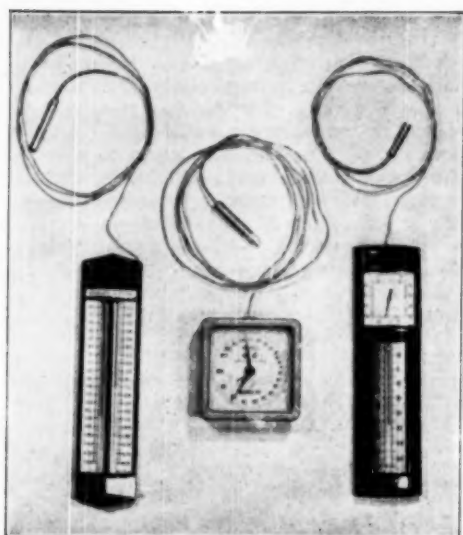


Figure 1 — Indoor-Outdoor Thermometers
From left to right: Taylor 1AP2, Marsh Duo-Temp, Airguide 404A.

monometers in a store must have been interested to note the considerable differences in the temperatures often indicated by various samples of the same make and model displayed in the same showcase. When buying a thermometer from a considerable number displayed in a hardware or 10-cent store, it is essential to select one that has no break in the liquid column, and it is important to select the thermometer whose reading is about the average reading of the thermometers displayed, as determined by inspection, as one in that way will be likely to obtain a thermometer with a fairly small error in the room-temperature region.

Most household thermometers are reasonably accurate around room temperatures, but are likely to have surprisingly large errors at extremes of temperature such as at zero, or 10 below, or 100 above zero. This is because such calibration as the thermometer receives in the factory is likely to be at moderate temperatures and no attempt is made to check the readings around zero or above 100 because the scales are a strictly mass-production job and are usually correct at only one point. Because of the rapid and non-individualized way in which thermometers are turned out, cheap brands often give about as accurate readings as expensive ones. The more expensive thermometers, however, have the advantage of better appearance, and are usually so constructed as to be better adapted to withstand the deterioration produced by weather,

without serious loss of visibility of graduations or impairment of appearance.

The most familiar type of thermometer consists of a glass capillary tube filled with a liquid which expands and contracts with rising and falling temperature (usually mercury or alcohol; alcohol has the advantage of remaining fluid at much lower temperatures than mercury, which freezes at about -38°F).

To avoid the type of error known as parallax, the eye should be at the same level as the top of the liquid column, and on this account the thermometer should be installed at average eye level. Unfortunately this conflicts with the desirability of setting a thermometer at the level which represents the breathing conditions in the room, which will usually be about three-and-one-half to four feet above the floor, or the position of the nose when a person is sitting. In general, the mercury or alcohol liquid column thermometer is satisfactory, convenient, and durable except that the column of liquid may sometimes, because of a shock or jar, be separated into two or more sections; the separation, of course, results in incorrect readings. It may often be quite difficult to reunite the separated parts of the column, and if the thermometer is an expensive one, it should be returned to the maker for the purpose. Thermometers using alcohol often have the disadvantage that the dye in the liquid will fade out in time.

In general, the manufacturers have been very casual about affixing the glass tube to the scale of graduations, with the result that the tube may

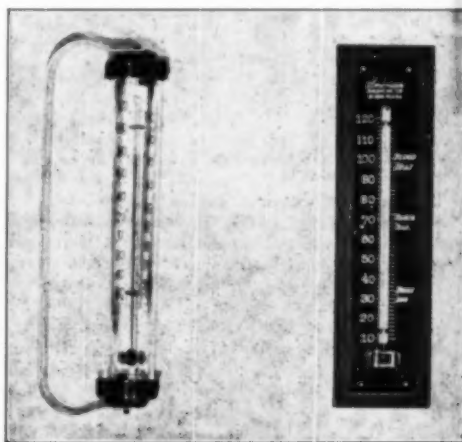


Figure 2 — Outdoor Thermometers
From left to right: Testrite, American 5057.

move in relation to the scale, which may produce an error of considerable magnitude.

A type of thermometer that has become increasingly popular, chiefly because of its gadget characteristics, indicates temperature by movement of a hand over a graduated dial. Most of these employ a bimetallic coil spring which expands or contracts with changes in temperature, causing the pointer to move. Although these thermometers are easier to read than liquid column thermome-

ters, they often suffer from mechanical defects; their accuracy is likely to be poor to begin with, and to deteriorate considerably with time and use. On that account, dial thermometers, unless of the expensive type such as are now widely marketed by Weston Electrical Instrument Corp., for laboratory uses, will be particularly likely to need checking from time to time against a mercury or alcohol thermometer known to be accurate. (However, it will be wise to check any mechanical thermometer from time to time against a liquid-column instrument of laboratory grade.)

Whatever the type, an outdoor thermometer should be placed near a window so that it can be read from inside the house, but far enough away to prevent the warmth from the window from affecting it in the winter. It should not receive direct sunshine. An indoor thermometer is best placed where it will be subjected neither to drafts of cold air from leakage around windows or doors, nor to heat radiated by or rising from a radiator, stove, range boiler, or hot-air register. It is best not to place a thermometer on an outdoor wall, for in such a location the temperature which it measures will be partly determined by the temperature of the wall rather than of the air.

Combination Indoor and Outdoor Thermometers

Indoor-outdoor thermometers are not new, but lately a good many combination instruments have been advertised by mail-order firms. One unit indicates indoor temperature, the other indicates outdoor temperature by means of a metallic bulb placed outside a window and connected to an indicating device, a dial or liquid-column glass tube, through a flexible metal-sheathed capillary tube. The flexible tube must be led into the house in such a way that it cannot be pinched by the closing of the window. It can be brought in through a small hole drilled through the casing of a casement window, through the wall, or through the casing of a double-hung window (if the building construction is such that the tube will not be touched by window counterbalance weights). A location very near the window is not a desirable one for the indoor thermometer; the combination instrument should be mounted on the wall as far from the window as the length of the flexible tube will permit.

CR has tested five typical thermometers over the range of temperatures that they ordinarily are required to record, by comparing them with a calibrated laboratory standard thermometer. The best of those tested, the *American*, had a maximum error of +2 degrees, whereas the poorest had a maximum error of -9 degrees.

Although only a few thermometers were tested,

UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON

National Bureau of Standards

Certificate

FOR

Liquid in Glass Thermometer

Model K
Maker's No. 9217

NBS 88920

Bureau File:
NBS-T-112365

TESTED FOR

THERMOMETER SCALE: -5 to 50°C in 0.1°

RESULTS OF TEST

READING OF THERMOMETER	TEMPERATURE	CORRECTION TO READING
+0.04°C	0.00°C	-0.04°C
10.00	9.97	-.03
20.00	19.97	-.03
30.00	29.98	-.12
40.00	39.96	-.04
50.00	49.99	-.11

In order to employ the above results correctly, the user of the thermometer should read and apply the note or notes designated by asterisks on the back of this sheet. The tabulated results are those obtained in the test, the probable accuracy is indicated in the tables in circular of the National Bureau of Standards C3, current edition.

July 30, 1947
JAF:KJE

Printed 10-47

For the Director

John H. Dineen
John H. Dineen
In Charge of Thermometry Laboratory,
Division of Heat and Power

- * **NOTE E.**—The tabulated corrections apply provided the ice-point reading, taken after exposure for not less than 3 days to a temperature of about 20° C (70° F) is +0.04°C. If the ice-point reading is found to be higher (or lower) than stated, all other readings will be higher (or lower) to the same extent. If the thermometer is used at a given temperature shortly after being heated to a higher temperature, an error of 0.01° or less, for each 10° difference between the two temperatures, may be introduced. The tabulated corrections apply if the thermometer is used in its upright position; if used in a horizontal position, the indications may be a few hundredths of a degree higher.

Figure 3

A National Bureau of Standards certificate for a standard thermometer, with part of the explanatory notes on the reverse of the sheet. It can be seen that even the test of so simple an instrument as a thermometer involves advanced scientific knowledge and a great deal of specialized experience.

the consumer may safely regard the findings as typical, for CR has had much experience over a period of years with the inaccuracies of household thermometers. Variation in manufacture is so great, indeed, that the findings on the instruments commonly sold are chiefly of negative, rather than positive, value. It is hoped that the workmanship will improve sufficiently in the next year or two that it will be worth while to make a test of a considerable number of popular makes and types. Present indications are that the consumer may do as well to buy an inexpensive thermometer as a higher-priced one; that on the whole he will do better not to buy the low-cost dial thermometers or the indoor-outdoor thermometers combined in one instrument, except possibly the *American* in the *B-Intermediate* group, unless he can be given assurance by a certificate furnished with the instrument that it has been tested and found to be correct within stated degrees of accuracy at ordinary room temperature, and at least at one extreme winter and one high summer temperature.

For Science Students and Teachers

To test thermometers is very good experience for science students in high school and college. Suitable standard thermometers for comparison purposes can be purchased from a scientific apparatus supply house; for example, Central Scientific Co.'s No. 19332 or Fisher Scientific Co.'s No. 15-040. A standard thermometer means one whose construction comes up to certain technical requirements and whose corrections are accurately enough known so that it can be used for the checking of other thermometers for ordinary purposes. No thermometer — or any other instrument, indeed — is exactly accurate or has corrections which are negligible when close work is involved. All instruments have errors; the problem of instrument standardization or calibration is finding and recording the magnitude of those errors and finding how they vary on repeated readings.

Where the cost of the standard thermometer would be an objection, an ordinary-grade laboratory thermometer much used by chemists and physicists in routine laboratory measurements, with graduations etched directly on the glass tube, will usually serve well enough, even without certification, as its errors would be likely to be pretty small compared with the errors of home and office thermometers. Students might be asked to bring in their thermometers from home and compare them with the laboratory thermometers or standard thermometers under proper conditions of steady outdoor and indoor temperatures and out of the sunlight, particularly in very hot summer weather and cold winter weather. In this way the

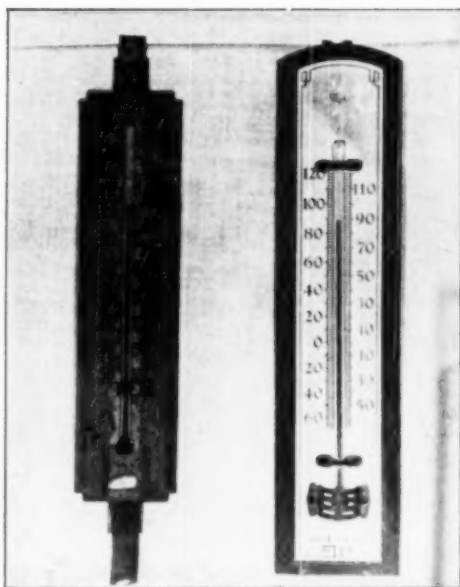


Figure 4

Two thermometers in a group of thirty-six studied by Consumers' Research. As can be seen, the thermometer at the left read 68 at the time the picture was taken, and the thermometer at the right read 88 when exposed to the same room temperature. Both were wrong. In this test the minus errors seemed to be very much larger than the plus ones, which undoubtedly helps to account for how much colder weather the thermometer seems to indicate at Mr. Smith's house than is justified by the report of the official thermometer at the weather station. Some typical errors other than the extremes mentioned were -14.5 , -13.5 , and -20.5 degrees Fahrenheit. The great amount of these discrepancies is interesting in illustrating the danger there may be in being dogmatic about outdoor temperature readings. As thermometers are customarily made, the typical household thermometer is likely to give one only an opinion rather than a fact about the temperature, and the consumer would surely be better off with fewer thermometers of a much higher grade. In a field where mass-production has been so long applied as in making of household thermometers, the extra cost of increased accuracy would be very moderate.

student can be introduced to the important idea of applying corrections to instrument readings by determining the numerical plus or minus corrections to be made in order to bring their ordinary thermometers' readings into agreement with the standard.

Ratings are cr49.

B. Intermediate

Testrite (Testrite Instrument Co., New York 3) 25c. A low-priced and recently very popular liquid-column thermometer, the stem of which is enclosed in a 1-in. glass tube, fitted with plastic caps that snap into a metal frame; the scale is on a cardboard strip. Neither frame nor scale considered adequately resistant to ex-

posure for outdoor use. Maximum error was -4 degrees at 102°F; maximum error in the moderate temperature range was +3 degrees at 32°F — too large. 1
American, No. 5057 (American Thermometer Div., Robertshaw-Fulton Controls Co., St. Louis) \$1.39. A well-made liquid-column thermometer. (Could be used outdoors, if temperatures do not go below 10°F.) Markings are stamped on enameled sheet metal and filled with white paint; it was judged that they would stand weather exposure well. Although the errors found were unduly large — up to two degrees — this thermometer is judged to be the best of those in the group tested, for household use. 2

C. Not Recommended

Airguide, No. 404A (Fee & Stenwedel, Inc., Chicago 47) \$5.50. An indoor-outdoor thermometer with liquid columns for both indoor and outdoor readings. The graduation scheme was considered an undesirable one and very likely to cause an error in reading. (The outdoor temperature scale was divided into 2-degree intervals; the indoor temperature scale was divided into 1-degree intervals.) The liquid columns were found

separated in the thermometer as received, and the tops of the tubes were covered so the back of the instrument had to be removed to ascertain if the liquid was separated when it was in the top bulb. Maximum error far too large: 9° in the range 44° to 58°, in which high accuracy should have been afforded. 3

Marsh Duo-Temp (Jas. P. Marsh Corp., Skokie, Ill.) \$6.75. A dial-type indoor-outdoor thermometer. The point of connection of the flexible tube to the bulb was not strengthened with a wire helix, as would have been desirable to reduce the likelihood of breaking or cracking of the tube at the point of flexure. Maximum error much too large: +5° at the temperature of 44°F (which is well within the range at which accurate readings should have been expected). 3

Taylor, No. 1AP2 (Taylor Instrument Co., Rochester, N. Y.) \$6. An indoor-outdoor thermometer with liquid column for outdoor temperature readings and dial for indoor temperature readings. The liquid column of the outdoor thermometer separated at 108°F during the tests. Maximum error much too large and ran to -7 degrees on outdoor thermometer at 58°F. 3

Safeguards Against Dangers of Lightning

THE following Do's and Don'ts, based upon scientific investigations of lightning phenomena conducted by the National Bureau of Standards and the warnings published in the July 1948 New Hampshire Health News, will help in avoidance of unnecessary risks during thunderstorms. In view of the fact that about 400 people are killed and perhaps 1000 injured each year by lightning in the United States, it is worth while to know what are the practical safeguards against the hazard.

1. Stop loading, unloading, and handling of flammable liquids or products in open containers in exposed places.

2. Leave the top of any tank, building, or elevated place or structure.

3. Discontinue any work being done on fences, telephone lines, power lines, structural steel erection, pipelines, roofs, and other metal materials which might conduct a lightning charge.

4. Do not go out of doors or remain out during thunderstorms unless it is necessary. Stay inside a building where it is dry. Within a house, the safest position is away from windows, stoves and other metal objects, fireplaces, telephones, and radio and television sets.

5. If there is any choice, select a place of shelter, in the following order:

(a) Large metal or metal-frame buildings.

Relative safety is afforded to persons who are working within metal shields, such as large build-

ings; likewise, the cabs of tractors, automobiles, trucks, cranes, power shovels, etc. Even though the building or machine may be struck, the person in it is likely not to be injured.

(b) Dwellings or other buildings which are protected against lightning.

(c) Large unprotected buildings.

(d) Small unprotected buildings.

6. Openings in buildings to the outside air should be closed at the approach of an electric storm, as lightning discharges often enter open windows and doors.

7. If remaining out of doors is unavoidable:

(a) Keep away from small sheds and shelters (if in an exposed location), isolated trees, telephone poles, drain pipes, television towers, wire fences, hilltops, and wide open spaces.

(b) Seek shelter in a cave, a depression in the ground, a deep valley, ravine, gulley or canyon, dense woods, a grove of trees, or at the foot of a steep or overhanging cliff.

References

Bureau of Standards Bulletin entitled, "Code for Protection Against Lightning," 30c, from Superintendent of Documents, Washington, D. C.

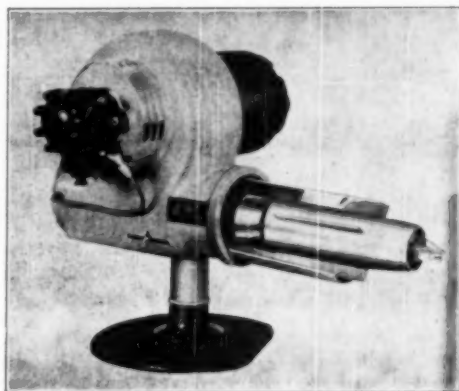
"Lightning and How to Dodge It," in New Hampshire Health News, July 1948, page 90. Copies (a limited number only) available, without charge, on request addressed to New Hampshire State Board of Health, Concord, New Hampshire.

Fuel Savings Claimed for New Oil Burner Heads

RECENT INCREASES in fuel oil costs have brought the price per gallon up to as much as 14.4 cents (CR BULLETIN, December 1948, p. 12); equivalent, on a direct heat value basis, to anthracite at \$26.60 per ton, a figure far above its present or recent market price. This has emphasized the need for refinements in oil burner design to reduce fuel consumption. Two other circumstances also suggest the need for more efficient burner design, if the lowest possible cost of operation and freedom from smoke and soot are to be obtained. The first is the recent change in fuel oil specifications to combine the former No. 2 and No. 3 oils into a new No. 2 designation of somewhat heavier grade; the other is the increasing use of catalytic cracked oils which, while they have a slightly higher heat value, are somewhat more tricky to handle without smoking, because of their being deficient in certain lower-ignition components which had formerly acted as a kindler to the remainder of the oil.

The common method of eliminating smoke was by merely admitting more air, but with the catalytic oils there is the serious disadvantage that the extra heat in these oils is then merely wasted in heating this additional air. Thus the gains that might have been realized are not obtained in practice. With the increasing use of catalytic oils the designer and servicemen on conventional burners face the dilemma of (1) permitting the burner to operate with objectionable soot and smoke, (2) permitting operation with the less objectionable but even more wasteful excess air, or (3) completely redesigning the air delivery and distribution systems (heads) of the burners.

The high-pressure gun-type oil burner has reached a point of almost complete standardization; the effect is to permit only gradual and relatively insignificant changes in all parts except the actual burner head. It was at this point therefore, that engineers, such as those of the Shell Oil Company, concentrated in an effort to improve efficiencies and to adapt burners better to the new oils. It is considered that the new turbulator heads that re-

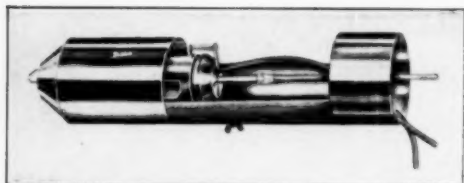


Oil burner with *Rischfeld* head in position.

sulted from this study represent the most significant, if not the only important, advance in home oil burner design in recent years.

The manner in which a burner head functions in feeding and mixing the oil and air for combustion determines how much of the potential heating value of the fuel will become available as useful heat. Of major importance is the intimate mixing of every particle of oil with enough air to burn it completely. If too little air has been supplied, or if enough has been supplied but cannot reach each particle of oil *while it is burning*, the oil will not burn completely, and a part of it will form soot and carbon. This involves a waste of fuel.

The design of the *Shell* and similar combustion heads is centered around efforts to proportion the flow of oil and air in just the right way and to insure controlled uniform mixing at all points in the flame until combustion is complete. Typically, as in the *Shell* head, this is accomplished by flaring out the discharge of high-velocity air from the head at a wide angle so as to form the surface of a cone which will closely conform to the shape of the oil-spray cone. This provides a maximum of intimate mixing and burning area. While the idea seems simple enough, extended research was required



Richfield Oil Burner Head

to avoid such characteristic defects of operation as noise, and a tendency to blow the flame away from the nozzle. Among the improvements claimed for the new burner head are a substantial reduction in fuel consumption, a cleaner flame, quieter burner operation, and a more regular steady flame shape.

Significant Fuel Savings Claimed

Shell has supplied a record of nine actual residential installations in which operation without the new heads for the heating seasons 1944-45 and 1945-46 was compared with operation with the *Shell* heads in 1946-47 in the same houses. An average annual saving of 22 percent of the oil was shown. Individual savings ranged from 15 to 24 percent with the head installation alone, and up to 36 percent where other basic changes, such as new combustion chambers, were made. All burners were operated on either No. 2 or No. 3 fuel oil (now combined as No. 2).

Field reports seem to substantiate the claims of The Shell Company; the only disadvantages cited are that burner adjustments are somewhat more critical than with conventional burner heads.

Two Ways to Secure Advantages of New Heads

There are two ways in which the consumer can gain the advantages of the new turbulator heads:

1. *By application to existing burners.* While it is theoretically possible to adapt the new combustion heads to any pressure-atomizing burner, physical limitations of the installation often make this difficult, so that the purchase of a new burner incorporating the head will often be the more desirable expedient. Some manufacturers are offering a specially designed casting with fan and combustion head that makes it possible to utilize the pump, trans-

former, motor, and controls of the existing burner providing, of course, that these are all in first-class condition. Even so, the costs of the change-over are estimated (by Shell) as between \$150 and \$200, and the installation could not carry the guarantee of new equipment. Such conversions can thus be recommended only for relatively new burners or those in excellent condition and, even then, only after the careful appraisal of a competent serviceman and careful consideration of whether the outlay will be warranted from an economic standpoint.

2. *By the purchase of a new burner incorporating the head.* As the Shell Oil Company does not make oil-burning equipment, manufacture of their new head was originally licensed to others for a nominal fee; now, the fee has been waived, and the head is offered to all manufacturers without financial obligation to Shell. As of October 1948, the following manufacturers had adapted the *Shell* head to their burners.

A. Recommended

Shell-Designed Combustion Head As Built Into New Burners (Developed by Shell Oil Co., 50 W. 50 St., N.Y.C.; distributed by Modern Die & Machine Co., 166 Pleasant St., Boston) Standard burning rate of original development, 0.75¹ to 1.75 gal. per hour. Two larger burners are now available with capacities of 3 to 6 gal. per hour, and 6 to 10 gal. per hour.

Richfield Flame Control Turbulator Head Oil Burner (Richfield Mfg. Corp., 315 Fifth Ave., New York 16) (It is understood that there is no connection with the Richfield Oil Co.) Claims of up to 50% savings are believed to be grossly exaggerated, as savings beyond the 20 to 25% claimed by Shell, if occurring, would probably be the result of other changes, such as modifications of the combustion chamber, rather than that of the new head alone. Nevertheless, the general design, particularly of the head, is believed to represent an advance over most conventional burner design. *Model SR-3*, 0.75¹ to 2 gal. per hour; *Model MR-5*, 2 to 4 gal. per hour; *Model LR-7*, 4 to 7 gal. per hour.

B. Intermediate

Shell-Designed Combustion Head As Applied To Existing Burners (Shell Oil Co.) Estimated cost of change-over, \$150 to \$200. Installation of head with special casting and new fan is possible and practicable on some burners, provided mechanics available are expert in the adaptation. Change-over considered advisable only where burner is relatively new (see text).

Richfield Flame Control Turbulator Head As Applied To Existing Burners (Richfield Mfg. Corp.) \$75 to \$95,

¹Not recommended when equipped or sold with a nozzle of less than 1 gal. per hour capacity.



Shell Oil Burner Head

installed. In addition to the limitations cited in the preceding paragraph, the *Richfield* head does not include a fan as the *Shell* does. Therefore, unless the air pressure is known to be adequate for the new relatively high-pressure system, a complete new oil burner must be installed. The ability of the servicemen or dealers to determine this point satisfactorily would seem to be open to question in many cases.

Firms Marketing Oil Burners Equipped with the New Shell Combustion Head*

Auto-Heat Corp., 311 W. 66 St., New York City.

George R. Bascom Co., Inc., 950 Old Colony Parkway, Boston 22.

Chandler Co., Cedar Rapids, Iowa.

Concord Oil Corp., 1 Hanson Pl., Brooklyn, N. Y.

East Coast Co., 141 Milk St., Boston 9.

Foreman & Pratt Oil Heating Equipment Co., 1109 Bay St., Toronto 5, Ontario, Canada.

Greene & Hodgson, Inc., 31 Commercial St., Providence, R. I.

Gould Oil Burner Co., 107 Terrace St., Roxbury, Boston.

Independent Oil Burner Corp., 139-24 Queens Blvd., Jamaica 2, N. Y.

Madsen Service, 3549 Nicollet Ave., Minneapolis 8.

Mr. Clark E. Johnson, d/b/a Oil-Elec-Tric Co., 1712 Fourth Ave. South, Minneapolis 4.

Park Oil Burner Mfg., 225 N. South Carolina Ave., Atlantic City, N. J.

Stanley C. Paterson, 789 Tremont St., Boston 18.

Sandberg Mfg. Co., 3850 N. W. Yeon Ave., Portland 10, Oreg.

Sid Harvey, Inc., Valley Stream, N. Y.

Tru-Heat Co., Miller Ave., Trenton, N. J.

Universal Steel Fabricating Co., 570 Mercer St., Seattle 8.

Weatherall Engineers, Inc., 387 Charles St., Providence, R. I.

Wisconsin Oil Burner Co., 1134 Regent St., Madison 5, Wis.

*The listing of the firms handling Shell heads is not to be construed as a recommendation of the burners involved, but is merely a guide to the names of manufacturers, for those who may wish to consider installation of one of the new heads and need information as to possible sources of the new equipment.

Control of Crabgrass

MANY home owners who have lawns to care for would give a good deal to find a way to get rid of crabgrass (sometimes known as water-grass, fall grass, or wire grass), which so often chokes off the growth of more desirable turf grasses. A number of chemical weed killers have been experimented with in the control of this pest, but no desirable brands have yet been found. Two kinds of crabgrass killers are said to be marketed at this time which, being made of arsenic or mercury, are extremely poisonous and might cause grave illness or death of persons or animals; besides, the value of the compounds for their purpose has not been fully established.

Crabgrass starts to grow early in May in some regions, or as soon as the ground becomes warm in the spring, and reaches full growth during June, July, and August, thriving best on heat and moisture, but it is able to grow and seed itself in even very dry soil. It has one weakness, however; it does not do well in shade. Thus, if it can be deprived of the sun for a week or ten days, its growth can be retarded, at least. The practical means by which the discouragement of crabgrass can be carried out through shading it, and in other ways,



will be found in a U. S. Department of Agriculture two-page mimeographed release dated June 21, 1939 (slightly revised August 10, 1946), entitled *Crabgrass Control*, which may be obtained without charge from the U. S. Department of Agriculture, Washington, D. C. This provides helpful suggestions in regard to the cutting of lawns that will help to afford the necessary shade; it also contains other helpful advice regarding fertilizing and sprinkling of the lawn.



Mow-Master

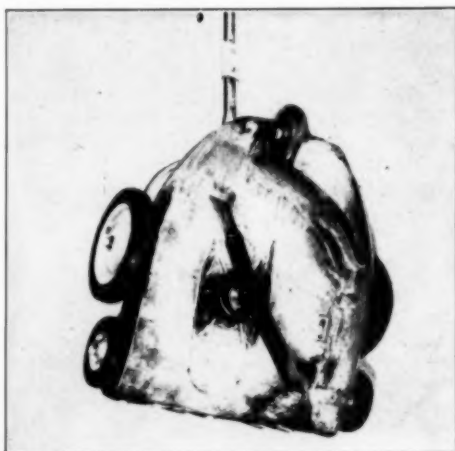
A Rotary Power Mower, Vertical-Shaft Horizontal-Blade Type

THE following report presents the results of a test of the latest model of the *Mow-Master*, an earlier model of which was tested by CR in 1947. In the present model many of the defects previously noted have been eliminated, and it is believed that the machine is as well guarded and about as safe as any mower of this general type can be made at this time. It must be remembered, however, that mowers of this type are inherently more dangerous than standard mowers which use a cutting reel revolving on a horizontal shaft, a point that should be given full consideration, particularly where there are children about. The manufacturer is well aware of the danger, for he warns users never to place hand or foot under the machine without first disconnecting the spark plug wire from the spark plug. Rotary flat-blade mowers do a good job of cutting lawn grass and are particularly useful when the grass has been allowed to grow too long for the usual sort to cut. They do have the disadvantage of depositing some of the clippings in rows, which must be raked up to avoid damage to the lawn; the raking, usually unnecessary with the old-style mower, can be a tiresome and time-consuming job for those who have large expanses of lawn.

B. Intermediate

Mow-Master, Model RM-947 (Propulsion Engine Corp., Kansas City, Kans.) \$149.50 f.o.b. factory. Consisted of a large aluminum base casting on 5 rubber-tired wheels, carrying a vertically-mounted 2-cycle gasoline engine rated at 2 hp. at 4000 rpm. Engine was controlled by governor to run at a maximum speed of approximately 3500 rpm.; rated horsepower at this speed was about 1.6. Width of cut, 19-5/8 in. Cutting height adjustable from 1 in. to 4 in. by raising or lowering engine assembly. Cutting knife seemed better

protected than other mowers of this type that we have seen. Protected at sides by skirt of base, which came to within 7/8 in. of ground except for a distance of about 9 in. on one side where there is no protection in the region at which grass clippings are ejected. The open front is guarded by a coarse metal comb having teeth 2 1/2 in. apart. This, however, was not stout enough for its job, and it was found that teeth bent easily in use test when tall weeds were being cut. The maker should supply a stronger guard comb. Met Federal Specifications in all major respects. Not self-propelled. (It is considered best, from a safety standpoint, that this type of mower should not be self-propelled.) Cut lawn grass well (see text), but was hard to push in cutting tall weeds.



View of underside of *Mow-Master* showing cutting blade.

Adhesives—Chiefly for Paper

Editor's Note: *The problem of mucilage and paste and other materials used for fastening clippings into scrapbooks and for various repairs in the household involving paper and similar materials may seem to our readers to be a relatively unimportant one. It is not so in fact, however, as many will know who have damaged valuable papers or photographs by the use of the wrong adhesive or have used an adhesive which failed to adhere strongly and permanently.*

Some years ago, many amateur photographers, intrigued by the convenience and non-wrinkling qualities of rubber cement, and the fact that it was so easily cleaned away from parts where the adhesive was not wanted, mounted photographs and other valued objects with this cement. In many, if not all, cases, this process proved very disappointing, for the cement caused a brown stain on the photograph, and after a time, perhaps several years, the print and its mount came completely apart, because the rubber cement had entirely lost its adhesive qualities. Much the same sort of difficulty has arisen with certain other types of cement offered by ten-cent stores and other dealers, which worked well on some materials but caused discoloration or permanent disfigurement of others. Some strongly alkaline adhesives and cements have this effect, although in their proper place, they may be very useful and give a strong bond. Thus it is seen that what may make a mucilage or cement attractive for immediate use may make it a very poor choice for a job where permanence or other factors may be particularly important, and above all it must be remembered that no one mucilage or glue will serve all purposes, even in the home.

Though the topic is an old one, and will seem to involve very simple considerations, there is a great deal that is not yet known about adhesives, and especially with regard to the permanence of the bond which they afford and their ultimate effects upon the papers and other substances which they are used with. In the present article, we set forth a brief survey of the problem; CR will be glad to hear from persons, particularly chemists, librarians, and archivists, who have had special experience or knowledge in respect to some or all of the materials discussed.

ADHESIVES used for such purposes as securing photographs to mounts, pasting clippings into scrapbooks, and similar jobs can be classified into four main types: library paste, mucilage, rubber cement, and synthetic resin adhesives.

Library Paste

The white paste generally known by the name of office paste or library paste is by far the most popular form of adhesive for paper. It is based on one or more of a variety of materials such as tapioca dextrin, wheat starch, potato dextrin, casaba starch, cornstarch, or rice starch. Starch from vegetables or grain is treated chemically or heated to a definite temperature with water, or both, in order to break down the starch into smaller molecules known as dextrins. Before the war, library pastes were well plasticized with glycerin and therefore retained sufficient flexibility when they dried out, but the shortage of glycerin during the war led to the marketing of some brands practically without plasticizer; these proved unsatisfactory. Definite information is not at hand, but there is reason to believe that some library pastes may still be

marketed without the needed amounts of plasticizer. Glucose is frequently an ingredient of pastes; it gives the product better consistency and helps retard its drying out. A preservative is required to prevent decomposition of the organic material by bacteria or molds; phenol (carbolic acid) is effective, but because its odor is objectionable to many persons, thymol is often used instead. Sometimes a cover-odor or perfume, such as oil of wintergreen or oil of cinnamon, is added. Some pastes contain agents, such as casaba starch, to make the product opaque, and some contain sodium perborate as a bleach to maintain a white and fresh appearance.

Library paste gives a satisfactory bond; because it contains water, it will often cause wrinkling of the paper; it may cause writing ink to run. It is used in large amounts in libraries for labeling and mending books, and ordinarily is purchased in concentrated form in gallon jars; such paste contains no bleach and no agent to increase opacity. In pasting bookplates in the front of a book, the plate is wet before the paste is applied, so that it goes on evenly without wrinkling. For mending books, the librarian uses strips of Japanese mending tissue, a

strong thin paper which is practically transparent after being pasted into a book with library paste; after it is dry, printing can be read easily through the mended part.

At one time water-well library paste was very popular. The paste jar contained a separate small well for water, so that the brush or rubber dauber attached to the cap could be wet before being applied to the thick paste in the main jar. This thick paste often dried up and cracked, leaving a useless residue. The fluid white paste now commonly sold is more convenient and less wasteful, particularly for use in the home where a jar of paste may need to last for months or even years before being used up. It is more readily thinned with water than is the thicker paste.

Some typical library pastes are:

Product	Price	Size	Adhesive Base	Appearance
<i>Carter's Cico Liquid Paste</i>	40c	6-oz. jar	dextrins in water	thick white fluid
<i>Sanford's Library Paste</i>	50c	5½-oz. jar	dextrins in water	solid white paste
<i>Sanford's Concentrated White Paste</i>	5c and 10c	2-oz. and 5-oz. jars	starch in water	solid white paste
<i>Woolco (Woolworth brand) Paste</i>	10c	7½-oz. jar	starch in water	solid white paste

Mucilage

Mucilage consists essentially of a colloidal ingredient such as gum arabic, dissolved in water. In some cases the gum is combined with dextrin. The color is ordinarily yellow to brown, although it sometimes is kept light by inclusion of sodium perborate as a bleach. As with library paste, a preservative such as phenol is required to prevent bacterial decomposition. The solids content of mucilage is between 25 and 40 percent.

Mucilage, though it has much the same advantages and disadvantages for pasting paper as has library paste, makes a less permanent bond than does the latter. The tendency of paper to wrinkle may be somewhat less than with library paste, but paper bonded with mucilage has a greater tendency to curl when dry. In recent years the use of mucilage has been popularized by use of two or three types of special rubber dispenser tops which in effect permit the bottle of mucilage to be used as a brush.

Commercially available mucilages, which have the appearance of an amber-colored liquid, include:

Product	Price	Size	Adhesive Base
<i>Carter's Super Mucilage</i>	10c	2½-oz. bottle	Irish moss in water
<i>LePage's Grip Spreader Mucilage</i>	10c	about 1-oz. bottle with rubber spreader top	gum arabic in water
<i>LePage's Liquid Glue</i>	10c	less than 1-oz. tube	gum arabic in water
<i>McCormick Iron Glue</i>	10c	1-oz. bottle	gum arabic in water

Rubber Cement

Rubber cement is a solution of rubber in a suitable solvent. Before the war, real rubber was used, but during the war various kinds of synthetic rubber were substituted, with unsatisfactory results. The ideal solvent for rubber cement (aside from its toxicity, which is great) is benzol, but fortunately for consumers' health, because of the high cost of benzol, a so-called rubber solvent, which is a petroleum naphtha, is normally used instead. An antioxidant is added to stabilize the rubber.

The great merit of rubber cement is that when applied on a good paper with hard surface, the excess can be "rolled up" and rubbed off after it has dried, so that if some adhesive extends beyond the photograph or clipping which has been fastened to a mount, it may be removed cleanly and easily.

This important property is one of the hardest to secure in the formulation of rubber cement, and the rubber cements made with synthetic rubber were sadly lacking in that respect. With natural rubber again available, good rubber cement can be obtained; the consumer will be wise to avoid purchasing from stock which gives the appearance of being old.

With rubber cement, two pieces of paper may be bonded together quickly and smoothly, and drying takes place quickly. The bond is more flexible than is one made with library paste. To insure a very lasting seal, it is important that a film of cement be applied to both surfaces to be joined, and that sufficient time be allowed for the solvent to evaporate before they are pressed together. Some rubber cements have failed to produce a permanent bond no matter how carefully they have been used. Rubber cement should not be used to fasten a photograph to a mount, if permanence is desired, because sooner or later, depending somewhat upon the quality of the cement, a brown stain will appear on the front of the photograph. (This effect may perhaps be attributed to the sulfur content of the rubber or the solvent, or both.)

While some of the best rubber cements will give a bond that will last for years, some other adhesive, animal glue, for example, must be used when a high degree of permanence is required. Other disadvantages of rubber cement are the odor of the solvent and its volatility, and especially the fact that the solvent, particularly if benzol (benzene) is used, is highly poisonous to breathe. (If much cementing with rubber cement must be done, it is best on all accounts to work out of doors or in a very well-ventilated room; in any event, let the work dry in an unoccupied room or on a porch.) As the contents of the jar are used up, the solvent evaporates, leaving a residue too thick to spread; when this happens, it is necessary to add more solvent, which may be obtained at a chemical supply house, if the amount of cement involved is sufficient to warrant the expense. (Re-solution may take considerable time. Do *not* on any account use leaded gasoline as a solvent.) Rubber cement must not be used near a flame or when smoking, because the solvent, whether benzol or the petroleum naphtha, is highly flammable.

Synthetic Resin Adhesives

The number of varieties of synthetic adhesives is very large. Many different synthetic resins are used in producing them, as well as mixtures of resins and mixtures of rubber with resins. The most important types include urea-formaldehyde, phenol-formaldehyde, polyvinyl, cellulose acetate, and nitrocellulose (cellulose nitrate). In addition to the resin content, the adhesive should contain a plasticizer to give flexibility to the dried film; dibutyl phthalate and tricresyl phosphate are two plasticizers in common use. Sometimes a stabilizer also is added. Some of these synthetic plastic adhesives bond by application of heat and pressure, and others by evaporation of their solvents in the same manner as does rubber cement. For household use, the solvent types are the ones commonly available. They consist usually of either cellulose acetate or cellulose nitrate, ordinarily made from motion picture film scrap from which the gelatin emulsion has been removed, and a solvent which may be acetone, methyl ethyl ketone, amyl acetate, methanol, or toluol. All such solvents are extremely flammable, and no adhesive of this type should be used near an open flame. Many of these products appear to have made inadequate use of plasticizers, and bonds made with them often have been short-lived. Like rubber cement, these ad-

hesives tend to thicken in their containers as the solvent evaporates, and may become useless even before being opened for the first time. For the occasional user, they may be purchased most economically in tubes in variety chain and hardware and stationery stores. Some readily available varieties, all nearly colorless liquids, are listed at the bottom of this page.

Thermoplastic adhesives in the form of thin sheets have been sold for many years in photo supply houses under the name *dry mounting tissue*. This originally consisted of thin sheets of shellac or of a similar natural gum, but in recent years synthetic thermoplastic adhesives have been used instead. In use, the tissue is placed between the mount and the photograph or clipping to be bonded to it, and heat is applied with a flatiron. The thermoplastic material softens under the heat, and upon hardening bonds the two surfaces firmly together. With the original tissue, it was necessary to have the temperature of the flatiron correct, for otherwise the tissue had a tendency to adhere only to the top sheet or only to the mount; with the improved tissue, such close control of the temperature is not required. Dry mounting tissue has no tendency to wrinkle, and if properly used, gives a permanent and flexible bond; it is, of course, an expensive and often not entirely convenient method of doing the job.

A process is now available by which pages of books that have become worn and fragile, or newspaper clippings that are to be kept more or less permanently, are laminated between two lightweight, nearly invisible plastic sheets. This is a relatively new technique and it is hoped that it may prove satisfactory for long-time preservation of the pages of valuable or irreplaceable books or clippings that are weak, brittle, or in need of repair. One man applying the method commercially is David Littman, bookbinder, at 20 E. Kingsbridge Road, New York 58.

The most authoritative information known on this type of question is that available from the National Archives, Washington, D. C., in their Bulletin No. 5, "The Repair and Preservation of Records," and it is recommended that that bulletin be consulted by anyone having an important job to do on papers of a high value or of an irreplaceable nature. The publication should be available in any large public library. It is also available on request addressed to the National Archives, Washington, D. C.

Product	Price	Size	Adhesive Base
Duco Household Cement	10c	3/4-oz. tube	nitrocellulose
John Collins China and Household Cement	10c	less than 1-oz. tube	nitrocellulose
Testors Cement	10c	2/3-oz. tube	nitrocellulose

Scotch tape is cellulose tape coated with an adhesive which produces a somewhat insecure bond by pressure alone. It is not suitable for use on a permanent repair job because the adhesive deteriorates with time, and the tape discolors, and also becomes stiff or brittle. Neither should it be used for temporary repairs on material of any value, because when the tape is removed it will be likely to take some or all of the surface and writing or printing along with it.

A newer material is sold under such names as *Prestoseal* and *Dura-Seal*, and something of the same type can be had from large dealers in artists' material. The price is about \$3 for a 5-yard roll of 24-inch width. The product is similar to cellophane, coated on one side with a colorless transparent pressure-sealing adhesive. It is applied to the surface of photographs, maps, or other papers to provide surface protection. A sheet is cut to size, placed on the surface to be protected, and pressed or rolled down firmly to squeeze out any air bubbles. One retail store which handles a product of this type states that it is claimed to give a permanent bond, and one which will not discolor with time; there have been no complaints as yet from customers, but the store is not willing to endorse the claims until more time has elapsed. We understand that museums have not yet been willing to risk use of the new type of mending material on their valuable documents. As with Scotch tape, any attempt to remove such a surface coating may remove some of the surface with it, so that its use should not be hazarded on documents of great value or in any case where there is likelihood that the coating material may need to be removed. Because of lack of sufficient knowledge concerning this type of protective sheet, especially in connection with irreplaceable material, its use cannot, for the present at least, be recommended, and there is thought to be at least a possibility that its effect may be to cause premature weakening or destruction of the paper with which it is in contact.

General-Purpose Adhesives

Although the solvent-type resinous adhesives are useful for the purpose of sticking papers together if their content of plasticizer is adequate, their principal uses in the household are for repairing heavier porous materials such as leather, wood, or felt, and for nonporous materials such as glass, china, porcelain, metal, and solid plastics. They are effective for applications in which library paste, mucilage, or rubber cement would fail completely, and are considered to give a reasonably lasting bond when properly applied. Synthetic-resin adhesives are more expensive than other types because of their more expensive ingredients, but their properties make them useful in many kinds of repair jobs.

In addition to the resinous adhesives, there are several other cements available for household mending purposes. *Cascos Glue* (Casein Co. of America, 350 Madison Ave., New York 17) is a white liquid consisting of a polyvinyl resin emulsion in water; it is suitable for use on paper, but is recommended particularly for gluing wood. The price is 40 cents for a 4-oz. jar. *Casco Household Cement* (Casein Co. of America) is a white liquid consisting of a casein-latex mixture in water emulsion, and intended for general repair work, especially for bonding a nonporous surface to a porous surface, as, for example, metal foil to paper or wood. The price is 25 cents for a 2-oz. tube.

Some dark-colored products which are available are less expensive to manufacture than the clear colorless types and are suitable for use where there is no objection to a dark seam. *Miracle Adhesive*, widely marketed in 10-cent stores and hardware stores, is an adhesive which has received some publicity in a popular magazine; it is a thick black liquid containing reclaimed rubber in a flammable and volatile solvent. Its promoters recommend it for use on both porous and nonporous materials, but it is not very strong, and it is not recommended for use in closed-off places where the solvent cannot evaporate, as in setting loose chair rungs and similar applications. The particular value of the type of cement typified by *Miracle* is its water resistance; it should stand a considerable amount of exposure to dampness, even to weather. The price is 25 cents for a 1 $\frac{3}{4}$ -oz. tube.

Animal glue, although still of major importance in furniture manufacture because of its low cost, has suffered a loss in popularity in household uses, largely owing, no doubt, to the rise of such products as *DuPont's Cement* (a pyroxylin product) or *Duco Household Cement*, *Ambroid*, and similar materials. The glue used in industry is applied hot, and good animal glue is soluble only when hot. It is important to note that the glues offered for household use and meant to be applied at room temperature have been modified by chemical means, and in so doing have lost some valuable properties of strength and toughness which are possessed by the hot-application glues. Some fish glues are still sold, but their offensive odor makes them unpopular.

One popular type of household cement much sold in 10-cent stores and hardware stores is sodium silicate or water glass. This is readily distinguished from the pyroxylin cement by the fact that it does not have a strong odor of solvent, but is a simple water solution of high alkalinity. It must never be used to attach anything to glass because it etches or corrodes glass and thus may result in the ruin of the surface of a valuable mirror, antique glassware, or a windowpane.

Off the Editor's Chest

(Continued from page 2)

asked to make a loan. In other words, what was measured chiefly was the *salability*, or market appeal, of the products turned out by the particular canneries.

Flavor is an intangible property that can be appreciated by anyone who has sampled new peas, fresh roasting ears of corn, and sun-ripened strawberries picked at the right moment of maturity and properly prepared for the table, but it does not lend itself to being read on the dial of a meter, nor is it determined by government grading experts, whose concern is not with what is good eating, but with what can be sold to best advantage in the wholesale and retail markets.

Nutritive quality is related to freshness and the proper stage of maturity, but recent researches, particularly those of Dr. William A. Albrecht of the University of Missouri, indicate that garden vegetables will vary in nutrient values according to the soil on which they are grown. No one yet knows how, for example, to compare the quality, from the consumer's standpoint, of tomatoes raised and canned in southern New Jersey with those from Indiana.

Some years ago, we had considerable correspondence with a U. S. Department of Agriculture official who indicated irritation at CR's rating as *C. Not Recommended* those brands of canned fruits and vegetables that government experts had found to be third grade. In one of his letters he suggested that there was a tendency to exaggerate the desirability of the top-grade products. Our position was that the government's standards purported to provide criteria for evaluating various canned fruits and vegetables on a quality basis and that, if the symbol *U. S. Grade A* on a label did not indicate top quality in essential respects, the federal government was lending its prestige and the services of its experts to a serious misrepresentation. That was ten years ago, and the wide publication of informative articles showing that the nutritive qualities of foods are affected by the fertility of the soil on which they are grown and raised is a much more recent development.

It is obvious that the new researches, pioneered by Dr. Albrecht and some others, have opened up large questions affecting the whole problem of evaluating and grading food. The present U. S. grades and standards are no doubt economically useful to some extent, for obviously the consumer should pay a considerably lower price for a can of peas than the government calls third grade than for one that is U. S. Grade A (although fussy people wonder why anyone would be willing to eat third-rate peas at any price), and no doubt from time to time we shall present the results of the government's type of scoring tests. The real evaluation of food from a nutritive standpoint must wait for further development of biological techniques and testing methods, that are quick and sufficiently inexpensive, to be applied to the articles that go into mass distribution. At present, the biological tests used chiefly rely on feeding experiments of laboratory animals through several generations. That is a slow and tedious process and the results could not be available in time to help consumers with the problem of buying cans of *this year's* pack of peas or peaches at the grocery store.

The consumer is in the practical position of having to buy most foods as best he can, on the basis of his own experience and taste; it is our opinion that he will be wise to give good flavor a great deal of weight in his decisions, for it is coming more and more to be recognized that fine, fresh flavor and high nutritional values go hand in hand. It is no longer in order to treat food as a mere fuel, which is to be bought at the lowest practicable cost per calorie (briefly discussed in *Off the Editor's Chest*, June 1949). The fact that the higher values in food materials cannot at present be readily measured does not mean that they are not to be sought, and are not important. It is our belief that they will come to be recognized as much more important than the factors the government graders now rely upon for their ratings of meat and canned and fresh fruits and vegetables.

New Standards for Sheeting

CONSUMERS who have been led to believe that grade labeling and standards are important elements in the problem of knowing what one is buying should study with care the new Specifications for Bleached Cotton Bed Sheets and Pillowcases, approved November 17, 1948, by the Ameri-

can Standards Association.

These standards, which have been long awaited by interested persons, are little different from the standards set by the Office of Price Administration in 1942. The OPA standards were criticized at the time by authorities in the textile and home

economics fields as being misleading, and encouraging production of unwarrantedly low qualities of sheets.

In the new Specifications, as in the OPA ones, sheets are classified merely as Types, in this case 200, 180, 140, and 128, numbers which represent the total number of threads, *both lengthwise and crosswise*, of the fabrics. One government publication in 1942 remarked (in a footnote) that "it is best when the number is equal in each direction," but neither the OPA standards then nor the ASA specifications now break the figures down into minimum count of yarns per inch in the warp and filling directions, respectively, so that the purchaser could tell how nearly equal or unequal the two thread counts are.

The housewife shopper might be able to tell about this fairly well herself by holding the sheet

up to the light, but her own ability to judge could be seriously hampered by the considerable amount of sizing tolerated by the ASA standards. Type 140 sheets, for example, which are heavyweight muslin, are permitted to have 4% sizing; Type 128 medium-weight muslin sheets are permitted 6%.

Better specifications, by far, would appear to be the A.S.T.M. Tentative Specifications for Bleached Wide Cotton Sheeting, which classify sheets by Types from 1 through 6, Type 1 being percale, Type 6 lightweight muslin. This numbering system alone may not be of too much help to the consumer, but at least it has the advantage of not being misleading. The A.S.T.M. Specifications do require a minimum count in *yarns per inch in both directions*, and they limit the sizing permitted to lower values than those tolerated by the ASA specifications.

Abridged Cumulative Index of Previous 1949 Consumers' Research Bulletins

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35 mm.! Mar., 25	Orange juice, frozen, quality standards June, 4	fire hazard May, 3
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Cleaner, all-purpose! June, 28	Paint, oil-restricted, quality Mar., 18	Toasters and a grill, automatic and semi-automatic! Apr., 15-16; June, 16-19
comb! Mar., 30	Phonograph needles, cactus! Feb., 16	Tomatoes, canned! Feb., 10-12
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Corrections and emendations Jan., 32-33; Mar., 26; May, 25; June, 23	record-players, delay buying! Mar., 16	Underwear, nylon, increased use June, 4
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danger to health June, 20-22; 4, 27	records! each issue	buying, Wisconsin pamphlet Mar., 3-4
Deodorant, home (Odac)! Feb., 30	Piano, buying—H! Mar., 22-23	high-priced, door-to-door selling May, 20
Detergents, soapless, use Feb., 3	Poison ivy and poison oak, treatment Apr., 4	Vacuum bottles! July, 21-22
on fine chinaware Apr., 3	Polish, furniture! May, 30	Vacuum cleaners, hand! Jan., 13-15
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Diet, adequate Mar., 30	Projectors, slide! May, 21-22	Weeds, chemical killing, not for home gardener Apr., 4, 29
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faulty, cause of excess weight increasing supply of meat and dairy products May, 4		X-ray, for hair removal May, 30
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RATINGS of MOTION PICTURES

THIS section aims to give critical consumers a digest of opinion from a wide range of motion picture reviews, including the motion picture trade press, leading newspapers and magazines—some 19 different periodicals in all. The motion picture ratings which follow thus do not represent the judgment of a single person, but are based on an analysis of critics' reviews.

The sources of the reviews are:

Box Office, Charm, Chicago Daily Tribune, Cue, Daily News (N.Y.), The Exhibitor, Harrison's Reports, Motion Picture Herald, National Legion of Decency List, Newsweek, New York Herald Tribune, New York Times, Parents' Magazine, Release of the D.A.R. Preview Committee, Successful Farming, Time, Variety (weekly), Weekly Guide to Selected Motion Pictures (National Board of Review of Motion Pictures, Inc.), and Unbiased Opinions of Current Motion Pictures which includes reviews by the General Federation of Women's Clubs, the American Legion Auxiliary, National Film Music Council, and others.

The figures preceding the title of the picture indicate the number of critics who have been judged to rate the film A (recommended), B (intermediate), or C (not recommended) on its entertainment values.

Audience suitability is indicated by "A" for adults, "Y" for young people (14-18), and "C" for children, at the end of each line.

Descriptive abbreviations are as follows:

adv—adventure
biog—biography
c—in color (Technicolor, Cinecolor, Trucolor, Magnacolor, Vitacolor, etc.)
car—cartoon
com—comedy
cri—crime and capture of criminals
doc—documentary
dr—drama
fan—fantasy
hist—founded on historical incident
mel—melodrama
mus—musical
mys—mystery
rom—romanticism of a novel
soc—social-problem drama
trav—travelogue
war—dealing with the lives of people in wartime
wes—western

A	B	C		
1	10	6	Act of Violence, An	war-mel A
1	9	6	Adventure in Baltimore	com AY
—	10	5	Adventures of Don Juan	adv-c A
—	2	6	Affairs of a Rogue, The	hist-dr A
—	7	6	Africa Screams	com AY
—	5	1	Against the Wind	war-mel A
—	5	1	Alaska Patrol	mel AY
—	9	7	Alias Nick Beal	fan A
—	7	7	All Over the Town	com AY
—	1	3	Amazon Quest	mel A
—	1	8	Angel on the Amazon	dr A
—	7	1	Any Number Can Play	cri-mel A
—	4	1	Arctic Fury	mel-remake AY
—	2	1	Arctic Manhunt	cri-mel AY
—	—	3	Arkansas Swing, The	mus-com AY
—	4	—	Arson, Inc.	cri-mel AY
3	9	3	Bad Boy	dr AY
—	1	5	Bandit, The	mel A
2	14	1	Barkleys of Broadway, The	mus-com-c A
—	5	10	Beautiful Blonde from	
—	—	—	Bashful Bend, The	mus-wes-c A
—	5	3	Big Cat, The	mel-c A
—	1	11	Big Jack	dr A
—	5	1	Big Sombrero, The	mus-wes-c AY
—	4	1	Big Steal, The	mel A
—	2	1	Black Magic	hist-dr A
—	1	3	Blind Goddess, The	dr A
—	5	2	Blondie's Big Deal	com AY
—	5	6	Blondie's Secret	com AY
—	7	6	Bomba, The Jungle Boy	adv-c AY
—	2	4	Boston Blackie's Chinese	
—	—	—	Venture	cri-mel AY

A	B	C		
—	7	8	Bribe, The	cri-mel A
—	4	12	Bride of Vengeance	hist-dr A
—	3	5	Broken Journey	mel A
—	3	3	Brothers in the Saddle	wes A
—	5	4	Calamity Jane and Sam Bass	wes-c A
—	8	8	Canadian Pacific	mel-c AY
—	5	2	Canterbury Tale, A	dr A
—	—	3	Caravan	adv A
—	2	14	Caught	dr A
1	12	4	Champion	mel A
—	4	3	Chips Are Down, The	nov A
—	6	9	City Across the River	cri-mel A
—	3	6	Clay Pigeon, The	mel A
—	3	7	C-Man	mel A
—	4	3	Colorado Territory	wes A
4	11	1	Command Decision	war-dr AY
—	14	3	Connecticut Yankee in King	
—	—	—	Arthur's Court, A	mus-com-c AY
—	1	2	Courtin' Trouble	mus-wes AY
—	7	4	Cover Up	dr A
—	2	3	Crime Doctor's Diary, The	mys-mel AY
—	5	11	Cross Cross	cri-mel A
—	1	9	Crooked Way, The	cri-mel A
—	1	7	Daughter of the Jungle	adv AY
—	5	—	Daughter of the West	wes-c A
—	3	1	Daybreak	dr A
—	3	1	Death Valley Gunfighter	wes AY
—	3	1	Dédé	dr A
—	1	2	Denver Kid, The	wes AY
—	1	2	Desert Vigilante	wes AY
—	8	2	Devil in the Flesh	war-dr A
—	2	2	Devil's Daughter	dr A
—	4	3	Don Quixote	dr A
1	5	2	Don't Take It to Heart	com AY
—	5	—	Doolins of Oklahoma, The	wes AY
4	11	1	Down to the Sea in Ships	mel AY
—	2	5	Duke of Chicago	mel AY
—	6	3	Easy Money	com A
—	12	7	Edward, My Son	dr A
—	1	3	El Dorado Pass	mus-wes AY
—	3	11	El Paso	wes-c A
—	—	4	Eternal Husband, The	dr A
—	4	1	Fallen Idol, The	dr A
—	4	1	False Paradise	wes AY
—	5	9	Fan, The	dr A
—	5	2	Far Frontier, The	mus-wes-c AY
—	1	3	Fear No Evil	dr A
—	1	4	Feathered Serpent, The	mys AY
—	2	5	Fighting Fools	cri-mel AY
—	9	3	Fighting O'Flynn, The	nov-c AY
1	7	8	Flamingo Road	dr A
—	2	8	Flaxy Martin	dr A
—	4	8	Forbidden Street, The	nov A
—	6	8	Force of Evil	cri-dr A
—	4	2	Frontier Investigator	wes AY
—	4	2	Gay Amigo, The	wes AY
—	2	2	Great Dan Patch, The	dr A
—	3	5	Great Gatsby, The	dr A
1	8	3	Green Promise, The	dr AY
—	4	2	Guaglio	war-dr A
1	7	6	Guinea Pig, The	dr AY
—	4	—	Gun Runner	mus-wes AY
—	2	3	Gun Smugglers	wes AY
—	—	4	Gunning for Justice	wes AY
—	6	—	Hellfire	mus-mel-c A
—	6	2	Henry the Rainmaker	com AY
—	3	7	Her Man Gilbey	com A
—	3	—	Hidden Danger	wes AY
—	1	6	Hideout	cri-mel A
—	3	1	Highway 13	mel A

A	B	C	
—	3	1	His Young Wife.....dr A
3	11	4	Home of the Brave.....propaganda-dr A
—	4	5	Homicide.....cri-mel A
1	4	1	House of Strangers.....dr A
—	4	1	I Am With You.....dr AY
—	1	3	I Cheated the Law.....cri-dr A
—	5	1	I Shot Jesse James.....mel A
—	7	5	Illegal Entry.....mel A
—	7	8	Impact.....cri-mel A
—	4	2	Incident.....mel AY
—	—	5	Interlude.....dr A
—	1	2	Iron Crown.....dr A
—	2	8	It Always Rains Sunday.....dr A
—	12	2	It Happens Every Spring.....com AY
—	1	8	Jigsaw.....dr A
—	5	1	Joe Palooka in The Big Fight.....mel AY
12	5	1	John Loves Mary.....com A
—	5	7	Johnny Allegro.....cri-mel A
—	5	8	Judge Steps Out, The.....com A
—	4	1	Jungle Goddess.....dr AY
—	2	3	Jungle Jim.....mel AY
—	7	5	Kiss in the Dark, A.....com A
1	8	6	Knock on Any Door.....cri-mel A
—	4	7	Lady Gambles, The.....dr A
—	7	3	Last Bandit, The.....wes-c A
—	2	3	Last Stop, The.....war-dr A
—	4	1	Law of the Barbary Coast.....mel A
—	5	1	Law of the Golden West.....wes AY
—	5	2	Lawton Story, The.....dr-c A
—	4	1	Leave It to Henry.....com AY
—	2	3	Life in Bloom.....biog-c A
1	5	10	Life of Riley, The.....com AY
2	6	9	Little Women.....dr-c YC
—	5	1	Loaded Pistols.....mus-wes AY
—	2	6	Loose Wolf and His Lady, The.....cri-mel A
—	5	2	Look for the Silver Lining.....mus-com-c AY
—	3	4	Lost Tribe, The.....mel AY
—	1	3	Lovable Cheat, The.....com A
—	—	3	Lovers, The.....dr A
2	11	1	Lucky Stiff, The.....cri-com A
—	6	4	Lust for Gold.....mel-c A
—	3	7	Ma and Pa Kettle.....com AY
—	5	4	Make Believe Ballroom.....mus-com AY
—	6	5	Man About the House, The.....mel A
—	2	1	Man to Men.....dr AY
1	5	6	Manhandled.....mys-mel A
—	—	3	Mark of the Lash.....wes AY
—	3	5	Massacre River.....mel-c A
—	4	2	Mighty Joe Young.....fan A
—	8	6	Miranda.....com A
—	2	3	Miss Mink of 1949.....com A
11	5	1	Mother is a Freshman.....com-c AY
1	9	2	Mr. Belvedere Goes to College.....com A
—	11	2	Mr. Perrin and Mr. Traill.....dr A
—	2	5	Mutineers, The.....mel AY
—	2	1	My Brother Jonathan.....dr A
—	2	4	My Brother's Keeper.....mel A
—	6	7	My Dream Is Yours.....mus-com-c A
—	11	3	Neptune's Daughter.....mus-com-c A
—	5	—	Night Time in Nevada.....mus-wes-c AY
—	1	9	Night Unto Night.....dr A
—	4	7	One Night With You.....mus-dr AY
—	6	8	One Woman's Story.....dr A
—	3	1	Operetta.....mus-dr AY
—	3	1	Outcry.....war-dr A
—	—	3	Outlaw Brand.....mus-wes AY
—	2	1	Outlaw Country.....wes AY
—	4	11	Outpost in Morocco.....mel A
—	1	2	Palace Scandal.....dr-c A
—	1	7	Parole, Inc.....cri-mel A
—	6	3	Place of One's Own, A.....mys-dr A
1	10	7	Portrait of Jennie.....dr-c A
1	4	5	Prejudice.....propaganda-dr A
—	1	3	Prince of the Plains.....wes AY
—	1	3	Professor, My Son.....dr A
2	14	1	Quartet.....dr A
—	2	1	Quick on the Trigger.....mus-wes AY
1	9	2	Quiet One, The.....doc-dr A
—	—	5	Rangers Ride, The.....mus-wes AY
—	11	5	Red Canyon.....wes-c AY
—	5	1	Red Menace, The.....propaganda-dr AY

A	B	C	
1	9	6	Red Pony, The.....dr-c A
2	9	5	Red Shoes, The.....mel-c AY
—	5	3	Red Stallion in the Rockies.....dr-c AY
—	4	1	Reign of Terror.....hist-mel A
—	3	4	Ride, Ryder, Ride.....wes-c YC
—	2	1	Riders of the Whistling Pines.....mus-wes AY
—	4	—	Rimfire.....wes AY
—	2	7	Rose of the Yukon.....mel AY
—	4	6	Roughshod.....wes A
—	3	—	Rozina, the Love Child.....dr A
—	4	2	Rustlers.....mus-wes AY
—	1	3	Rusty Saves a Life.....dr AY
—	7	—	Sand.....mel-c AY
—	6	4	Saraband.....hist-dr-c A
2	4	2	Scott of the Antarctic.....dr-c AY
—	—	1	Search for Danger.....mel A
—	7	1	Secret Garden.....dr-c AY
—	1	2	Secret Mission.....war-mel A
—	2	3	Secret of St. Ives, The.....mel-c A
—	—	3	Secrets of a Ballerina.....dr A
1	10	5	Set-Up, The.....mel A
—	4	1	Shamrock Hill.....mus-fan AY
—	3	1	Shep Comes Home.....dr AY
—	3	5	Sheriff of Wichita.....wes AY
—	5	5	Shockproof.....mel A
—	—	4	Silver Trails.....mus-wes AY
—	1	9	Siren of Atlantis.....fan A
—	5	1	Sky Dragon.....mys-mel AY
—	6	5	Sleeping Car to Trieste.....cri-mel A
—	7	6	Slightly French.....mus-com-c A
—	2	1	Smoky Mountain Melody.....mus-wes AY
—	4	4	Snowbound.....dr A
—	2	10	Song of India.....mel AY
1	10	1	Sorrowful Jones.....com A
—	9	7	South of St. Louis.....wes-c A
—	6	2	Special Agent.....cri-mel AY
—	1	2	Stagecoach Kid.....wes AY
—	2	3	Stallion Canyon.....wes-c AY
—	5	1	Stampede.....wes AY
—	6	5	State Department—File 649.....mel-c A
—	1	3	Strange Gamble.....wes AY
3	14	—	Stratton Story, The.....dr AY
—	9	5	Streets of Laredo.....wes-c A
—	2	3	Streets of San Francisco.....cri-mel A
—	8	5	Sun Comes Up, The.....mus-dr-c AY
—	3	2	Susanna Pass.....mus-wes-c AY
—	1	2	Symphony of Life.....mus-dr-c A
1	10	6	Take Me Out to the Ball Game.....mus-com-c AY
—	2	2	Take My Life.....mys-mel A
—	1	6	Take One False Step.....mys A
—	4	4	Tale of the Navajos.....doc-c AY
—	6	6	Tarzan's Magic Fountain.....fan AY
—	4	4	Temptation Harbor.....dr A
—	1	12	This Was A Woman.....dr A
—	2	2	Thunder in the Pines.....mel A
—	4	1	Tomorrow's a Wonderful Day.....doc-dr A
—	2	6	Too Late for Tears.....cri-mel A
—	—	3	Trigerman.....wes AY
—	2	2	Trouble Preferred.....mel A
—	3	2	Troublemakers.....com AY
—	2	5	Tucson.....wes AY
2	10	2	Tulsa.....mel-c AY
—	6	3	Tuna Clipper.....mel AY
—	8	4	Undercover Man, The.....cri-mel A
—	2	3	Unknown Island.....dr-c A
—	1	4	Valiant Hombre, A.....mel AY
1	9	4	Wake of the Red Witch.....adv AY
—	8	2	Walking Hills, The.....wes A
—	3	2	Wandering Jew, The.....dr A
—	3	5	Waterloo Road.....war-dr A
1	10	5	We Were Strangers.....mel A
—	1	3	Wench, The.....dr A
—	2	4	What's On Your Mind.....doc A
—	5	8	Whiplash.....mel A
—	12	1	Window, The.....mys-mel AY
—	1	3	Woman in the Hall, The.....dr A
—	3	3	Woman Trouble.....com A
—	3	9	Woman's Secret, A.....mus-mel A
—	—	4	Yank Comes Back, A.....doc A
—	4	5	Younger Brothers, The.....wes-c A

The Consumers' Observation Post

(Continued from page 4)

intent in cases of false claims for therapeutic effect on the label. It was almost impossible to prove what the state of mind of a manufacturer was with respect to claims made for some particular product, and obviously no one wants a return to the days when a dangerous product like Korezlu, a depilatory containing a deadly rat poison, injured so many of its users that the company was forced to cease operations only by bankruptcy from mounting lawsuits; it suffered no further punishment. If you object to the uncontrolled sale of such products, it will be helpful to let your congressmen and senators know that you are opposed to the "Moore" amendment and any other amendments that would unreasonably weaken present enforcement of the Food, Drug, and Cosmetic Act.

* * *

BUYING A HOUSE DRESS is probably something that every woman thinks she knows how to do, but just in case she wants advice, the U. S. Department of Agriculture provides a few pointers. Be sure the waistline is at the right place and check for comfortable fit around the hips, bust, and upper arms. Always sit down in a dress before buying it to check that it will be comfortable. Read the label to make sure color is fast to washing and that the amount of shrinkage is specified. Look for seams that are wide enough to be let out if necessary and carefully stitched so that they will not pull out, particularly in the armhole seam. No matter how low its price, no dress is a bargain that shrinks, fades, or otherwise proves to be unwearable after the first few launderings.



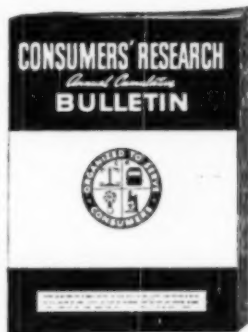
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HOW MANY TIMES should a man expect to send his shirts to the laundry before they begin to show wear? According to an article in the Christian Science Monitor, shirts will tear and fray after their twentieth washing, even if the laundry is careful. On the other hand, the American Institute of Laundering sets 31 washings and wearings as the average number to be expected from the average shirt worn by the average individual.

* * *

SAFETY ADVICE IN FACTORIES can now be given automatically by a sound device that reproduces spoken messages on a magnetic metallic wire in a flat glass case, with a loud-speaker attachment. The idea is that when a worker throws a machine switch without fastening the safety guard, the device will broadcast a warning, "Better fasten the guard while you've a hand to use it"; or when a smoker approaches an area where there are combustibles, he will be greeted with, "Douse that cigaret" — a good way to help the absent-minded and the careless.

* * *

CUTTING CEDARS in the north forty to make new fence posts may require getting permission from a government official even if you do own the trees, if a bill introduced by Senator Clinton Anderson of New Mexico is passed by both houses of Congress. The object of the bill, according to The Wall Street Journal, is to permit the federal government to regulate the cutting of trees on private lands of over 40 acres that it considers to be too young, and to enable it to require restocking with new trees. It appears that, in the South particularly, there are a number of small sawmills that are subsisting mainly on small timber. One justification for government control is based on the projected need of protecting "forest owners following proper practices" from being put at a "competitive disadvantage." The present pressure for extended control of lumbering operations is reported to come from the U. S. Forest Service.

* * *

U. S. CAPACITY FOR FOOD PRODUCTION has so expanded in response to wartime demands that a higher level of food consumption will be needed in the years ahead, points out a release from the U. S. Department of Agriculture. In order to step up consumption, it is suggested that many people will need to include more livestock products, fruits, and vegetables in their diet. Even small shifts to more livestock production, it appears, would readily absorb any expanded food output. Of course those surplus potatoes that the government has bought up to keep them off the market, and that are costing the taxpayer a pretty penny could no doubt be eaten happily by hogs and thereby provide more pork chops and bacon.

Consumers' Research, Inc. Washington, N. J.

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PHONOGRAPH RECORDS

BY WALTER GRUENINGER

Please Note: In the ratings AA indicates highly recommended; A, recommended; B, intermediate; C, not recommended. Although nearly all new releases of serious music are heard, space narrows comment, generally, to sets which merit high ratings.

Beethoven: *Prometheus* — Overture and Ballet Music No. 8. Dresden Philharmonic Orchestra under von Kempen. 4 sides, Deutsche Grammophon Set 1. \$6.30. First in a new series of postwar recordings pressed in Germany, released here by the London Gramophone Corporation, 16 W. 22 Street, N.Y.C. Beethoven's music to the ballet, consisting of an overture and 16 numbers, was a great success with the Vienna public of 1801, but only the overture is heard in concerts now. The performance is spirited and solid; the recording, heavily bassed, is resonant as with one microphone placed at a distance. High frequencies are fainter than those heard on today's most brilliant sets. Yet, lush and pleasing. Good surfaces, slightly audible.

Interpretation AA
Fidelity of Recording A

Debussy: *Cinq Poemes de Charles Baudelaire*. Jennie Tourel (mezzo-soprano). 6 sides, Columbia Set 828. \$4.05. Opulent and perceptive singing of seldom heard, uninteresting French art songs. Six sides become monotonous. Well recorded with excellent balance and sufficient room resonance.

Interpretation A
Fidelity of Recording A

Ballet Music of Delibes. Indianapolis Symphony Orchestra under Seitzky. 10 sides, RCA Victor Set 1305. \$7.25. Pleasant and tuneful are these excerpts from "Coppelia" and "Sylvia" with power and quality in the performance. Adequate recording with better bass than highs is marred by surface noise heard on most sides. No matter how I turn the controls of my custom-made amplifier (Flora Electronic Laboratory), the 45 rpm pressing (Set WDM 1305, \$5.25) heard with an Astatic FL 33 pickup is better only to the extent that surfaces are less audible. I find no justification for Victor's claim, printed on envelopes in this 45 rpm set, that "this record is the ultimate in recording technique, bringing you the most perfect high fidelity reproduction ever offered in the history of the record industry."

Interpretation AA
Fidelity of Recording B

De Falla: *Suite Populaire Espagnole* (3 sides) & *Sarasate: Caprice Basque* (1 side). Stern (violin). Columbia Set MX 314. \$3.10. Kochanski made this musician's transcription from entrancing songs composed by De Falla, performed eloquently by Conchita Supervia for Decca and Olga Coelho for Hargail. The performance is expert, the recording round.

Interpretation AA
Fidelity of Recording A

Gould: *Spirituals for Orchestra* (5 sides) & *Quickstep* (1 side). Philharmonic-Symphony Orchestra of N.Y. under Rodzinski. Columbia Set 832. \$4.15. The composer has attempted to convey the mood and the idiom of spirituals. I'd gladly trade the 5 sides plus the filler for Marian Anderson's singing of "Nobody Knows de Trouble." Rodzinski, the orchestra and the engineers do their part well. Surface 4 scrapes.

Interpretation AA
Fidelity of Recording A

Max Lichtegegg Sings Lehar Operettas (tenor). 6 sides, London Set 63. \$7.35. Selections from the "Merry Widow," "Gypsy Love," etc., sung heartily though none too subtly.

Interpretation A
Fidelity of Recording A

Mozart: *Concerto No. 1 in B Flat* (K191). Leonard Sharrow (bassoon) with the NBC Symphony Orchestra under Toscanini. 4 sides, RCA Victor Envelope Set 1304. \$2.50. I hear elegance and refinement in this music but little inspiration. Toscanini is the hero, for Sharrow's performance is not striking. The bassoon sounds hard, the orchestra bright

but the recording is not particularly wide ranged. Acceptable surfaces. The 45 rpm pressing (Victor Envelope Set WDM 1304, \$2.20) offers no higher fidelity.

Interpretation A
Fidelity of Recording A

Mozart: *Serenade No. 10*. Members of the Boston Symphony Orchestra under Koussevitzky. RCA Victor Set 1303. \$6. A refreshing work for wind instruments. Unfortunately, several movements are missing. Sensitive playing and rather close-in recording, not widest range. The 45 rpm pressing (Set WDM 1303, \$4.50) is less expensive but no better in any way I can hear.

Interpretation AA
Fidelity of Recording A

Reger: *Variations and Fugue on a Theme of Mozart*. Concertgebouw Orchestra of Amsterdam under van Beinum. 10 sides, Deutsche Grammophon Set 2. \$14.15. One of Reger's late works revealing clarity and charm in orchestral writing. Brahmsian. The conductor and his men perform their task like masters. Yet, I did not thoroughly enjoy the set because of deficiencies that occurred after the performance. Inasmuch as most of the music is soft, surface noise intrudes nearly all the time. Lead in and lead out grooves fail to do their job quickly, causing in the second instance annoying delay from music to music, when played with a Webster changer. One-microphone effect, translucent recording with a high end that is less impressive than you can hear on many other disks. Short measure on four sides. Sides 2 and 5 waver in pitch.

Interpretation A
Fidelity of Recording B

Schumann: *Overture to Manfred* (3 sides) & *Beethoven: Overture to the Consecration of the House* (5 sides). NBC Symphony Orchestra under Toscanini. RCA Victor Set 1287. \$4.75. A wonderful performance and recording of *Manfred* and a good performance of *Consecration*. The high frequency range of the violins comes through dry and unnatural in *Consecration*. Noisy surfaces.

Interpretation A
Fidelity of Recording A

Strauss: *Salomé* — Final Scene. Welitsch (soprano). 4 sides, Columbia Set MX 316. \$2.95. This dazzling, shocking scene calls for more nuance than Welitsch summons, though in many respects she is topnotch as is the conductor, Reiner. For the full impact of the soprano part, sung with greater richness, hear Marjorie Lawrence, on Victor 8682, in French. Columbia's orchestra is better recorded than Victor's but there is little to choose between the recording of the voices. Both orchestras play well.

Interpretation A
Fidelity of Recording A

Strauss Waltzes. Philadelphia Orchestra under Ormandy. 4 sides, Columbia Set MX 315. \$3.10. The glorious "Blue Danube" and "Tales from the Vienna Woods." I prefer more lilt but readily acknowledge the set has given me much pleasure. Uneven recording with more bass than usual.

Interpretation A
Fidelity of Recording A

Folksongs of the British Isles. Merrill (baritone) 6 sides, RCA Victor Set MO 1306. \$4. Complaints about performance, which are minor, center on pompous concert style, diction and lack of distinction. Heavily recorded with few sibilants. There is nothing to praise in the 45 rpm pressing beyond all that's good about the 78.

Interpretation A
Fidelity of Recording A

RECOMMENDED SINGLE DISKS — COLUMBIA: Pinza on C 72802. VICTOR: Iturbi on V 12-0921. Schiøtz on V 12-0924. Menuhin on V 12-0922.

